

Birds in Wales
Adar yng Nghymru

Vol. 12 No. 1

August 2015

ISSN 1359-1649



Edited by Stephanie J. Tyler

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Welsh translations by Rhion Pritchard

Published in August 2015 by The Welsh Ornithological Society
www.birdsinwales.org.uk
Charity No. 1037823
Price: £12.00

EDITORIAL

Another year has passed and it is time to again write an editorial for Birds in Wales. I am delighted that there has been such a good response from authors. Resulting papers cover a range of birds from Chough and Storm Petrels to Curlew and Oystercatchers.

Firstly Ian Spence has produced a fascinating account of some historical work on Storm Petrels carried out at Strumble Head in Pembrokeshire. Then two papers on waders - Faith Jones who has written the paper with Ian Harris and Rachel Taylor on Oystercatchers received a WOS Student award in 2014 and Rosemary Sigger who has co-authored the Curlew and Wind farm paper with Mick Green was the recipient of a WOS Small Grants Scheme award.

The main paper in this issue, on the Red-billed Chough, has been long-awaited and will be of interest to all. Adrienne Stratford and Tony Cross have for a staggering 24 years been researching this enigmatic species and on the Llŷn peninsula alone have colour-ringed over 1,200 nestlings. They discuss movement patterns and the changing fortunes of the species and suggest land management solutions.

The South & West Wales Wildlife Trust was the recipient of conservation small grant in 2015 to create a Sand Martin bank at Parc Slip in South Glamorgan. I am pleased to include a brief report on the progress of the project and also of the Swift project being undertaken in North Wales by Ben Stammers of the North Wales Wildlife Trust, also funded by WOS. Lastly, an obituary by Anne Brenchley on our former and sadly missed Chairman, Derek Moore.

I wish Rhion Pritchard, who has agreed to take over as editor of Birds in Wales, every success in the future and I thank Ian Spence in particular for his enormous help with the layout of this and previous issues of our journal.

Steph Tyler

Some results from catching Storm Petrels at Strumble Head, Pembrokeshire

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Summary

Ringling of Storm Petrels was conducted at Strumble Head during summer months, mainly between 1991 and 2003. A total of 847 birds was ringed and 39 birds ringed elsewhere were captured (controlled). Recoveries of ringed birds and the origins of the controlled birds showed movements around all the coasts of Britain and Ireland.

Crynodeb

Gosodwyd modrwyon ar Bedrynnod Drycin ym Mhen Strwmbwl yn ystod misoedd yr haf, yn bennaf rhwng 1914 a 2003. Modrwywyd cyfanswm o 847 o adar, a daliwyd 39 aderyn oedd wedi eu modrwyon mewn mannau eraill. Dengys y mannau lle modrwywyd yr adar hyn, a mannau ailddarganfod yr adar a fodrwywyd yma, symudiadau ar hyd holl arfordiroedd Prydain ac Iwerddon.

Introduction

As a relatively young ringer I was inspired by Mainwood (1976) and Fowler *et al* (1982) and I wanted to try catching Storm Petrels *Hydrobates pelagicus*, a bird I had never seen let alone handled. It is a mysterious nocturnal seabird that was usually caught for ringing at exotic island locations. I was not able to go to such places but thought it might be possible to catch and ring Storm Petrels at the Pembrokeshire headlands that jut out into the St George's Channel.

My first attempt to catch Storm Petrels was at St David's Head in August 1983 and I caught three. They were wonderful little birds and I wished to ring more, but this site was not suitable as it was a long walk to carry the equipment and there was no shelter in which to process the birds. I investigated Strumble Head, which being further east seemed less likely to be successful but did have the clear advantages of being easy to get to with all the equipment and had a sturdy shelter. Also, there was a position where nets could be erected out of the glare of the beam from the lighthouse. It turned out to be a suitable site and I used it regularly between 1991 and 2003.

I lived at least 210 km from Strumble Head (near Rhuthun and then near Mold). The nature of Strumble Head means that netting works best on a moonless night with slight offshore wind (ie from the SE quadrant) to carry the sound from the lure out to sea. Consequently, I had to choose the visit dates at the last minute after checking the weather forecast.

Methods

Two mist-nets (one of 10m and one of 6m) were used, the shorter one angled at about 120° to the longer and going inland. The old coastguard building was used as the ringing base which provided shelter from any wind and or moisture. The ringing activity required a minimum of two people and for most visits I was accompanied either by Adrienne Stratford or Dafydd Roberts. Once the nets were erected a loud sound lure was used (initially using compact tapes then CD) using an amplifier powered by two 12v motorcycle batteries. The output was from a single horn speaker pointing north, straight out to sea. The nets were usually open and the lure working between about 23.00 and 03.30 - 04.00.

On the busier nights one ringer would be extracting birds from the nets, avoiding the use of a headlight. Meanwhile, the other would be processing birds already caught by the light of a small gas lamp in the building. The processing involved first checking that they had already been ringed and if so recording the number. If the birds were new they were ringed, the wing feathers were examined to try to age the birds using Baker (1993) when it became available though in most cases it was not possible to determine their age, had the wing length measured (maximum chord) and weight taken using a Pesola balance. The details were recorded in a ringing book and later entered onto a computer database.

Results

The total number of new birds ringed was 847 and 39 other birds were controlled (ringed by someone else at a different location). Of these, five of the birds ringed at Strumble Head were retrapped there, one bird was retrapped twice, and two of the controls were retrapped on other days. The annual totals are shown in Table 1.

Table 1. The annual totals of birds ringed (847) and first controlled (39) at Strumble Head.

Year	1983	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Ringed	7	88	59	94	184	84	63	29	0	44	76	0	96	23
Controlled					6	1	6	5		5	8		7	1

The numbers of birds ringed, controlled and retrapped in each month are shown in Table 2.

Table 2. The months in which Storm Petrels were ringed, controlled or retrapped at Strumble Head. Two controls were retrapped during July. The word 'retrapped' means a bird first ringed at Strumble Head was retrapped there.

Month	May	June	July	August
Ringed	3	27	793	24
Controlled		1	38 (2)	
Retrapped			6	

As can be seen, the main month in which personal availability and the weather conditions coincided was July, consistent with Wernham et al (2002).

Of the 847 birds ringed, 55 birds were recovered, all of them controlled by other ringers elsewhere, involving a total of 64 recapture events. None of the birds had been found dead. The number of years between ringing and the recapture events are shown in Table 3. The equivalent for birds controlled at Strumble Head are shown in Table 4.

Table 3. The numbers of recaptures (n = 64) of 55 different Storm Petrels showing the number of years between the ringing and recapture dates.

Years since ring date	0	1	2	3	4	5	6	10	15
No. of recaptures	32	14	7	5	2	1	1	1	1

Table 4. The numbers of recapture events (n = 41) of 39 Storm Petrels showing the number of years between the ringing date and being controlled at Strumble Head.

Years since ring date	0	1	2	3	5	21
No. of recaptures	15	16	6	1	2	1

Of the six retraps of five birds ringed at Strumble Head, two were retrapped within 24 hours of being first ringed.; and the other three birds were retrapped in the year following ringing, one having been caught at Leganagh Point, Co Cork just two days before the retrapping at Strumble Head.

The ringing sessions always seemed to be best in July and this is confirmed in Table 5, below. The worst session was a night when there was an equipment malfunction and no sound was produced. We packed up and drove back home overnight. This session is not included in the table.

Table 5. The numbers of birds caught during each ringing session. In this table the two birds ringed elsewhere (controls) that were retrapped at Strumble are included in the 'Retraps' column.

Month	No. of sessions	New birds	Retraps	Controls	Total catch	Mean	Min. catch	Max. catch
May	1	3	0	0	3	3	3	3
June	1	27	0	1	28	28	28	28
July	16	793	7	38	838	52.4	1	110
Aug	5	24	0	0	24	4.8	1	9

The mean weight of the newly ringed birds was 26.0g (n = 845). This is remarkably close to the weight quoted in Robinson (2005) of 25.57g for adults (n = 20,482).

There were many unknowns about the birds we caught. Firstly, I was not sure if we were sampling from one large pool of birds that moved around all the coasts of Great Britain

or a smaller pool mainly from sites in the Irish Sea. Also, were we sampling one sex rather than the other and if there were identifiable differences between the sexes. We were unable to sex the birds that we caught by, say, examination of their genitals so would there be a difference in wing lengths? (See Figure 1 below)

There is no clear bimodality and the distribution appears to be normal which suggests there were no differences, by sex or origin, between any of the birds we caught. The mean wing length for the whole sample as 124.2mm (n=847) which is close to the 120mm for males and 121mm for females quoted in Cramp et al (1977) and 122.6mm (n=22122) in Robinson (2005). The wing lengths of the controlled birds were within the same range as the birds ringed at Strumble Head. There was no clear indication of bimodality and the mean wing length of these birds at first recapture was 124.1mm (n=39).

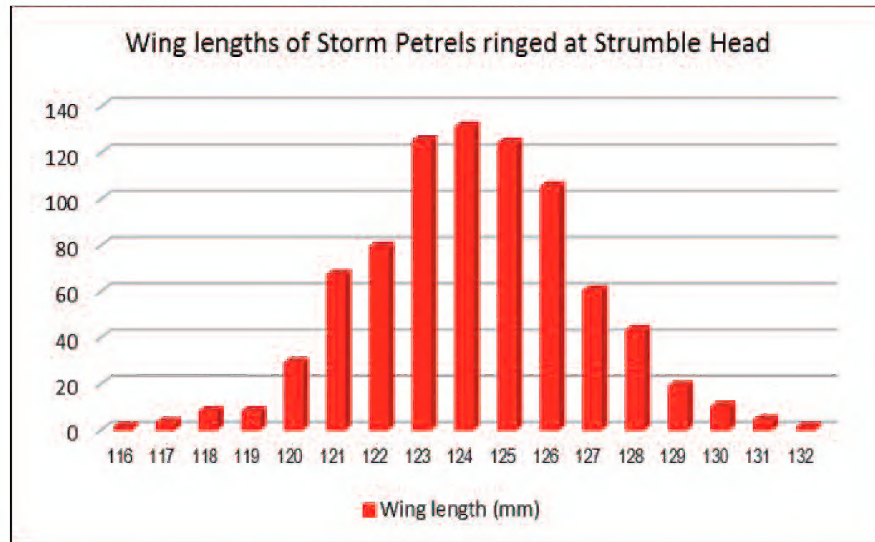


Figure 1. Histogram of wing lengths of 817 Storm Petrels ringed at Strumble Head.

Over the years we received details of where the birds we ringed were subsequently recaptured and where controlled birds that we caught had originally been ringed. It appeared that birds caught at Strumble Head mainly moved through the St George's Channel and Irish Sea and up the west coast of Scotland and east as far as the Orkneys (Figure 2) but none reached the Shetland Islands.

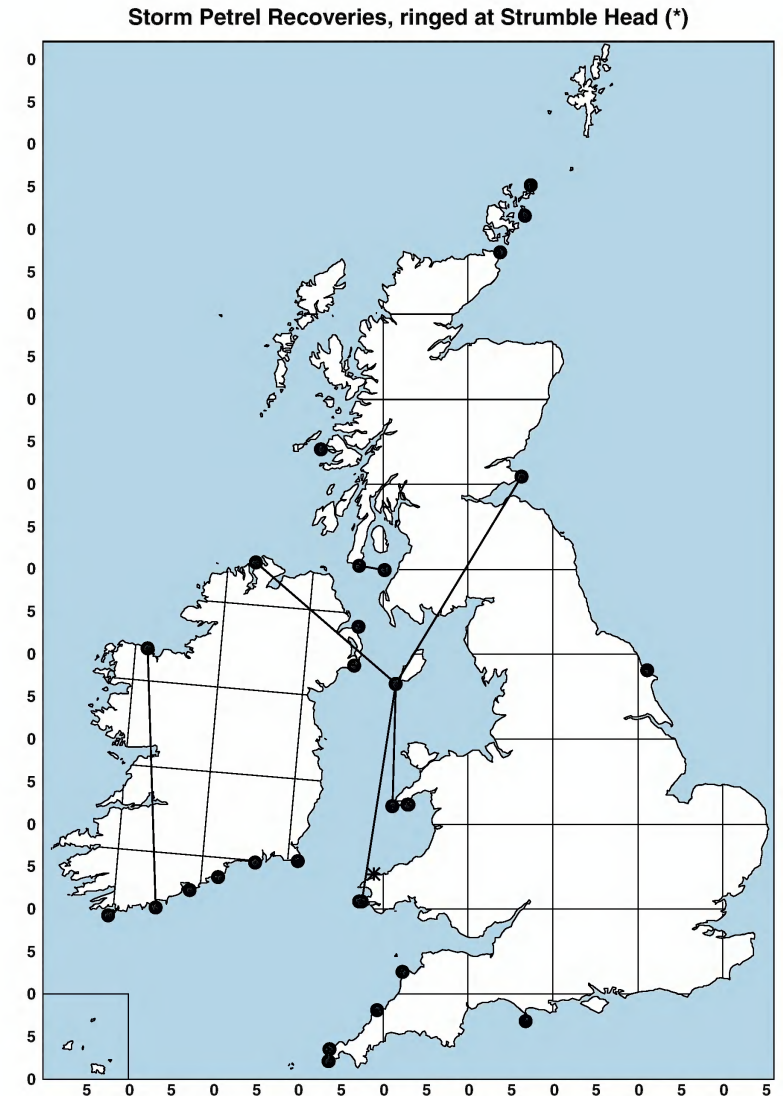


Figure 2. The dots indicate where Storm Petrels ringed at Strumble Head were subsequently recaptured by other ringers. The seven lines show where each of seven birds were recaptured at different locations (one is short, between Bardsey and Trwyn Cilan on the Llyn Peninsula).

The locations from which the birds we controlled had come from were nearly as well scattered and are shown in Figure 3. These origins, though from a small sample, do lend some support to the notion of a subpopulation without links to the northern isles.

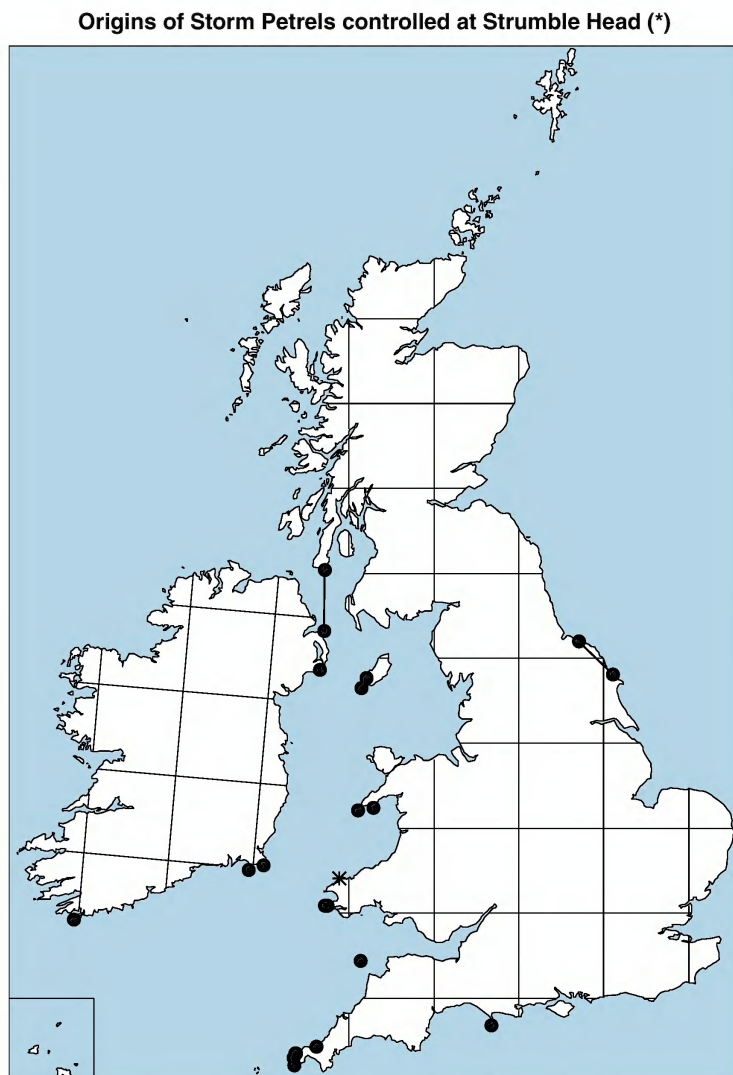


Figure 3. The locations of the original ringing sites of Storm Petrels controlled at Strumble Head. The lines show locations where two birds were recaptured away from Strumble Head.

Some of the movements between locations were relatively quick and the most interesting are shown in Table 6 which include birds moving both to and from Gwennap Head in Cornwall.

Table 6. Details of some of the quicker movements. The distances are straight lines between the two locations. For the last two, Storm Petrels almost certainly did not fly directly between the two places and the distances around the coasts, either by the northerly or southerly routes would have been about 1,000km.

Movement to or from Strumble Head	Distance (km)	Days	Km/day	Other location
From	226	1	226	Gwennap Head, Cornwall
From	139	1	139	Brownston Head, Co Waterford
From	91	1	91	Cilan Head, Gwynedd
From	161	1	161	Rumps Point, Cornwall
From	256	2	128	Leganagh Head, Co Cork
From	497	11	45	Fife Ness, Fife
To	225	1	225	Calf of Man
To	226	1	226	Gwennap Head
To	400	9	44	Filey Brigg, North Yorkshire

There were three key locations for recoveries and as sources of controls (see Table 7). They are all either in the Irish Sea or across the Celtic Sea in Cornwall.

Table 7. The locations at which most of the birds ringed at Strumble Head were recovered or from which the most birds at Strumble were controlled.

Location	No of recoveries	No of controls
Calf of Man	14	3
Bardsey Island	8	4
Gwennap Head, Cornwall	5	8

Discussion

It is considered that the majority of the birds caught by luring such as ours are 'wanderers' which are immature birds that have not yet established themselves as breeders at a particular colony (Mainwood 1976, Fowler and Okill 1988). The nearest known breeding sites to Strumble Head would be North Bishop and Ramsey (both about 26 km distant), Skomer (37 km) and Skokholm (c41 km) but no ringing was taking place there at that time and Bardsey (82 km) away. Given that during the winter months, Storm Petrels move well south in the Atlantic Ocean as far as South Africa, the movements between different potential colonies in Great Britain and Ireland are insignificant in terms of distance.

The results present some anomalies in that for the birds controlled at Strumble Head, especially, it would be expected that if they were 'wanderers' that they would have been controlled 0-1 or perhaps 0-2 years after ringing. The majority were within these parameters. However, four birds were controlled much later than would be expected for 'wanderers', especially that controlled 21 years after ringing, a bird that was ringed at Cape Clear, Eire, 314 km distant. It should have been established at a breeding colony by then, but there is no known breeding by Storm Petrels at Strumble Head. For the birds that were newly ringed at Strumble Head, those birds that were really 'wanderers' would be expected to be recovered soon after ringing. Indeed, the majority of recoveries were within 0-2 years of being ringed. It is possible that those recovered after more years were actually breeding close to where they were later captured.

From the information about bird movements, the picture that emerged was that birds caught at Strumble Head mainly moved through and within the St George's Channel and Irish Sea, very similar to the patterns of recoveries and controls from birds caught on Skokholm (Brown and Eagle, 2014). The data here also include movements up the west coast of Scotland and east as far as the Orkneys (Figure 3) but none reached the Shetland Islands. Wernham et al (2002) indicated that birds breeding in the Irish Sea may be a subpopulation that does not have links with the northern isles. The data, here, particularly the movements to the Orkneys, do not fully support that idea, though data from a larger sample is needed. Surprises were the recoveries of birds on the west coast of Ireland and the east coasts of Scotland and England.

This small programme of ringing has established that Storm Petrels regularly pass through the St George's Channel moving between colonies and these wanderers explore sites from which appropriate noise can be heard by the birds. This adds just some small detail to the overall picture of wandering Storm Petrels flying all round our mainland coasts seeking suitable places to start breeding. More catching of Storm Petrels at Strumble Head may provide further information about the potential origins of these birds and whether they do seem to be separate from those breeding at the north of Scotland. With the renovation of the bird observatory at Skokholm there may be birds from that colony to compare with samples from the other Welsh islands where they are known to breed. From the data provided here it seems that July would be the best month in which to concentrate catching effort so long as the weather is suitable. It is not yet clear if changes in weather patterns with global warming will affect the possibilities for catching Storm Petrels at Strumble Head.

Acknowledgements

I am very grateful to Adrienne Stratford, Dafydd Roberts and others who assisted with the ringing operations and to Dafydd and Anne Brenchley for comments on drafts of this contribution. I thank Steve Sutcliffe for comments that led to improvements with the paper. The maps were produced using DMAP by Dr Alan Morton and I thank him for his assistance with a query.

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Storm Petrel. Photo: Zac Hinchcliffe

Reconciling wind energy production and wading bird conservation: are wind farms contributing to Eurasian Curlew *Numenius arquata* declines in Wales?

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Summary

Europe's largest wading bird, the Eurasian Curlew *Numenius arquata*, is experiencing ongoing national declines, and is consequently listed as a priority species in the UK Biodiversity Action Plan. These declines have been facilitated by loss and fragmentation of suitable nesting sites, due in part to agricultural expansion and subsequent landscape fragmentation. However, an emerging land use, the development of wind farms to generate renewable energy, has been recently recognised as having possible negative impacts on curlew population dynamics, although little is currently known about exactly how this affects their distribution at upland breeding sites. This study aimed to address this issue at one of the few remaining Welsh strongholds, Montgomeryshire, an area with existing and proposed wind farm sites. Surveys were carried out at two key sites north of Carno, Mynydd y Hendre and Twmpath Melyn during April and May 2014. Resulting maps highlighted that at least three pairs were found to be using these sites, but it is possible that there may be more. These findings will prove useful in future attempts to fit satellite tags (which was unsuccessful in the present study), to observe spatio-temporal distribution changes during further construction and operation of wind farms.

Crynodeb

Mae niferoedd y Gylfinir, *Numenius arquata*, y mwyaf o rydyddion Ewrop, wedi bod yn gostwng ers amser ar raddfa genedlaethol, ac fe'i rhestrir fel blaenoriaeth yng Nghynllun Gweithredu Bioamrywiaeth y DU. Rhan o'r rheswm yw colli a dryllio safleoedd nythu addas, yn rhannol oherwydd ymestyniad amaethyddiaeth a dryllio'r tirlun yn dilyn hyn. Fodd bynnag, sylweddolwyd yn ddiweddar y gallai un defnydd tir newydd, datblygiad ffermydd gwynt i gynhyrchu egni adnewyddadwy, gael effaith negyddol ar ddeinamig poblogaeth y Gylfinir, er nad oes llawer o wybodaeth ar hyn o bryd sut yn union mae hyn yn effeithio eu dosbarthiad ar safleoedd nythu yn yr ucheldir. Nòd yr astudiaeth yma oedd casglu gwybodaeth yn un o'r ychydig gadarnleoedd sy'n weddill yng Nghymru, sir Drefaldwyn, ardal lle mae eisoes safleoedd ffermydd gwynt a chynlluniau am eraill. Gwnaed arolwg o ddau safle pwysig i'r gogledd o Garno, Mynydd yr Hendre a Thwmpath Melyn, yn ystod Ebrill a Mai 2014. Dengys y mapiau fod o leiaf dri phâr wedi eu darganfod yn defnyddio'r safleoedd, ond efallai fod mwy. Bydd y canlyniadau o fudd i ymdrechion yn y dyfodol i osod tagiau lloeren (nad oeddynt yn llwyddiannus yn yr astudiaeth bresennol), i ddarganfod newidiadau o ran lleoliad a thros amser mewn dosbarthiad yn ystod gwaith adeiladu pellach a gweithrediad y ffermydd gwynt.

Introduction

Population declines of wading birds

Great Britain hosts internationally important populations of migratory waders; providing extensive wetland habitats to support over-wintering species, and vital stop-over sites along the East Atlantic Flyway. Many of these UK sites have been designated Special Protection Areas (SPAs) and Wetlands of International Importance (Ramsar Sites). However a report by Hayhow *et al.* (2014), a collaboration between the RSPB, British Trust for Ornithology (BTO), and the Wildfowl and Wetlands Trust (WWT), together with UK government nature conservation agencies, highlighted a decline in the number of waterbirds wintering in the UK. This decline in the 'wintering waterbird indicator' has been ongoing since the turn of the 21st century, and is particularly apparent for the 'wading bird indicator', which is at its lowest level since 1990 (Hayhow *et al.* 2014). For example, this annual publication reported ongoing declines of several species of wader, such as Dunlin *Calidris alpina*, Redshank *Tringa totanus*, and Eurasian Curlew *Numenius arquata* (Hayhow *et al.* 2014).

Principal causes of these ongoing declines in wading bird populations are believed to be changes in global climate and land use (such as agricultural expansion and land management) – these are widely recognised as major issues of environmental concern in the UK, and are key areas of policy importance to stakeholders in scientific research and practise (Sutherland *et al.* 2006).

Agricultural intensification has facilitated the process of land conversion, resulting in habitat fragmentation and subsequent declines in farmland bird populations throughout Britain and Europe (Evans 2004). According to the State of Birds in Wales Report (Johnstone *et al.* 2011), breeding curlew saw a significant decline of 49% on farmland in Wales between 1995 and 2009. With approximately 80% of the land in Wales being used for agriculture (Johnstone *et al.* 2011) engagement with land owners is a vital component to successful, sustainable management of farmland for biodiversity.

Impacts of emerging land uses such as onshore windfarms, have recently been highlighted as having potential negative impacts on the breeding success and population dynamics of waders, with particular concern over ground-nesting species such as curlew (Whitfield *et al.* 2010). It is though that birds may be negatively affected during both construction and operational phases of wind farm development. A recent study by the RSPB suggests that most impact occurs during the construction phase (Pearce-Higgins *et al.* 2012); habitat loss associated with land use change can result in displacement of ground-nesting waders at their breeding sites, affecting their reproductive success and overall population dynamics. Factors associated with the operational phase include direct collision with rotor blades, and 'shadow flicker' (ground disturbance caused by moving turbine shadows). Noise pollution can impact at both stages, and can last for the subsequent 25-year operational life of the wind farm.

However, there is still conflicting evidence regarding the role of wind farms as a causal factor in avian population declines, and further research is needed to consolidate these

findings (Whitfield *et al.* 2010). In light of current proposals to expand renewable energy production in Wales through the development of large-scale wind farms (Green 2012; National Assembly for Wales 2005), further research is urgently needed to inform local and national species action plans for curlew. Furthermore, this also presents a novel and interesting research opportunity to help reconcile two high-priority issues: species conservation and sustainable energy production.

Despite the concerning population trends observed for wading birds in the UK, it is still unclear whether these declines are due to one single causal factor, or a cumulative impact of several factors. For example, in addition to emerging land uses such as wind farms, the impacts of predation by foxes and corvids has recently been highlighted as having potential negative impacts on the breeding success and population dynamics of wading birds, with particular concern over ground-nesting species (Douglas *et al.* 2014; Fletcher *et al.* 2010; Whitfield *et al.* 2010). Further research is therefore necessary to gain a better understanding of landscape interactions of wading birds, and to what degree each of these factors impacts on breeding success.

The focal species for the present study, the Eurasian curlew, is a species of global conservation value, having suffered widespread declines across its breeding range (Birdlife International 2013; cited in Douglas *et al.* 2014). Inhabiting upland and lowland areas, curlews can exploit many different habitat types, from estuaries and wetlands, to farmland and moorland. Despite this, however, they are experiencing ongoing declines across the UK, with populations falling by 44% between 1995 and 2010 (Eaton *et al.* 2012). Consequently, they are now recognised as an Amber List Bird of Conservation Concern, and a priority species in the UK Biodiversity Action Plan (BAP; Joint Nature Conservation Committee (JNCC) 2010; Wilson *et al.* 2005). According to the 2012 Breeding Bird Survey, Curlew populations in Wales have suffered significant declines of 57% between 1995 and 2011 (Risely *et al.* 2013), where it is recognised as a Red Listed Principal Biodiversity Species under Section 42 of the NERC Act 2006.

Aim of Investigation

Montgomeryshire is one of the few remaining strongholds for curlews in Wales, but has also been identified in Welsh Government planning policy as a 'Strategic Search Area' for wind farms (Green 2012). Most known Curlew breeding areas in Montgomery are within or adjacent to proposed windfarms. However, Curlews are already in decline before any of these proposed developments have been consented to or built. It is therefore important to know how these birds use this area, to devise mitigation strategies to alleviate impacts on breeding success.

The focus of this project is to investigate habitat use and range of Curlews during the breeding season; in particular, to investigate a possible negative interaction with wind farms, as a local driver of population decline. Specifically, it aims to map Curlew distribution and habitat use in upland areas around existing and proposed wind farms in Montgomery, using GPS satellite tags to provide accurate location data in this moorland/farmland mosaic. This project will form part of a broader study conducted by

the Ecology Matters Trust, to determine why many species of upland waders are declining in Wales.

Methods

Observational surveys were carried out at proposed wind farm sites in the area north of Carno, with sites at Mynydd y Hendre (Hendre Mountain) and Twmpath Melyn, in Dyfnant Forest (grid ref: SH9901). The purpose of these surveys was firstly to determine nest location sites, with a view to attaching satellite tags; and secondly to gain a better understanding of Curlew behaviour during the breeding season (e.g. displays of territorial behaviour such as alarm calling, and distance between nests). Surveys were carried out between 28th April and 12th May 2014, at sites believed to have supported breeding Curlew in previous years.

On farmland around Mynydd y Hendre, vehicle-based observations were useful initially as a non-invasive method to gain a better understanding of: (1) how many pairs were in the area; (2) what other species were present, (3) landscape composition; and (4) the amount of day-to-day disturbance e.g. farm vehicles and traffic to nearby quarry. After close monitoring of pairs, transects were walked through the habitat in an attempt to flush individuals out, and reveal approximate nest locations. At Tympath Melyn, a public footpath route was walked to survey for curlew around adjacent farmland and moorland.

Results

At Mynydd y Hendre, sightings of several possible breeding pairs were made during the survey period (however only two pairs observed at any one time), as well as frequent displays of territorial behaviour (chasing / alarm calling): (1) one pair were observed foraging in rush *Juncus* sp. bog close to the quarry access road, before one individual disappeared out of view; (2) one pair observed chasing another pair away and producing alarm calls; and (3) on approach, one individual flushed out from within a patch of *Juncus* sp. bog and joined its mate, both producing alarm calls; (4) in another instance, one individual was flushed out by a passing farm vehicle, emerging from within the large patch of *Juncus* sp. bog close to the quarry access road. Territorial displays were also observed towards predatory species: a Buzzard *Buteo buteo*, which was seen circling close to where one Curlew was foraging, and another towards a group of corvids.

At Twmpath Melyn, one pair was observed on farmland from the public footpath; however one individual then left its mate, producing alarm calls, and flew into a field further downhill. A bird of prey was observed in the spot where this pair were originally observed, later on in the study. On a second occasion, one Curlew was observed alarm calling and chasing two Carrion Crows *Corvus corone*, on farmland close to the boundary with a large expanse of moorland / bog further uphill.

Discussion

Managing fragmented landscapes for species operating on different spatial scales, has been identified in Sutherland *et al.* (2006) as one of 100 ecological questions of high policy relevance in the UK. This is particularly applicable to the conservation of migratory wading birds such as the Eurasian Curlew, which inhabits a broad range of habitats across a diverse altitudinal scale. Appropriate moorland and farmland management strategies could be considered crucial in conserving suitable breeding habitat, and helping to safeguard their future in British landscapes (Hayhow *et al.* 2014).

The present study has improved our understanding of Curlew distribution in the farmland / moorland / upland bog mosaic north of Carno. Resulting maps highlight at least three pairs using this area, which is not only the proposed site for a new wind farm, but also for the planned substation. These results, combined with previous data (Mick Green, pers.obs.) have shown that this region has one of the highest densities of breeding Curlew in central Wales.

Based on initial observations of Curlews in Carno, several further flushing attempts were made at each site to try to determine exact nest locations. This was made more difficult because of their tendency to emerge away from the nest site when disturbed, and was unfortunately unsuccessful in the short time frame of the study, preventing satellite tags being fitted. Despite this, it is highly probable that there is one nesting pair on farmland at Tympath Melyn, and at least two pairs using the farmland around Mynydd y Hendre (observed at the same time, with one pair showing territorial behaviour towards the other). It is possible that there may be a third or fourth pair nesting at this site, and also two at Twmpath Melyn; however it is difficult to determine the exact density, since observations were made over multiple visits during the course of 14 days, and it is possible that the same pair may have been observed more than once on the same day.

Obtaining a more detailed, long term understanding of Curlew habitat preference and breeding success in Montgomery is important, particularly in relation to changing patterns of land use discussed above. Fitting satellite tags would be an effective method of observing spatio-temporal distribution changes during construction and operation of wind farms, since Curlews are a long-lived, monogamous species, and remain faithful to breeding sites throughout their reproductive lifecycle (Cramp and Simmons 1983; cited in Green 2012).

Resulting satellite-derived location data would have two interesting applications in relation to emerging threats towards Curlews: firstly, to provide an insight into whether there is a real relationship between proximity to wind farms and Curlew nest density in Montgomery, and how this changes through construction and operational phases of each wind farm's lifespan. Secondly, overlaying Curlew nest data with predator distribution data, would highlight to what degree 'co-habitation' occurs within such fragmented habitats; it would also provide useful information to help us understand how significant their interaction is in determining Curlew population dynamics.

Acknowledgements

Thank you to the Welsh Ornithological Society for funding this project and to Mick Green for supervision.

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Curlew and Oystercatcher. Photos: Derek Moore

Oystercatcher *Haematopus ostralegus* roost site-faithfulness changes with age over time

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Summary

Understanding wintering Oystercatcher roosting patterns will enable us to better plan how we use the coast. My study found that the Lavan Sands Oystercatchers were one population of site faithful birds occasionally moving between roost sites. Immature birds were more likely to move roost than adults. Roosting patterns were not stable over time. Between 1995 and 2000 Oystercatchers used few sites, none of which were on Anglesey. Between 2000-2005 more roost sites were in use, including roosts on Anglesey. The reasons for this change are unclear.

Crynodeb

Bydd deall patrymau clwydo Piod Môr yn ein galluogi i gynllunio'n dull o ddefnyddio'r arfordir yn well. Dangosodd fy astudiaeth fod Piod Môr Traeth Lafan yn un boblogaeth o adar sy'n ffyddlon i safle arbennig, weithiau'n symud o un safle glwydo i'r llall. Roedd adar ifanc yn fwy tebyg o newid safle glwydo nag oedolion. Nid oedd patrymau clwydo yn sefydlog dros amser. Rhwng 1995 a 2000 defnyddiai'r Piod Môr ychydig o safleoedd, dim un ohonynt ar Ynys Môn. Rhwng 2000 a 2005, defnyddiwyd mwy o safleoedd clwydo, yn cynnwys safleoedd ar Ynys Môn. Nid yw'r rhesymau am y newid yn glir.

Introduction

Pressure continues to rise in coastal areas, with waders often affected by changes in land use and shellfish harvesting (Caldow *et al.* 2003; Lotze *et al.* 2006). In order to better plan how we use our coast, we need to have a more complete understanding of how waders react to such pressures.

Oystercatchers are long-lived waders, taking up to five years to mature. They exhibit complex social interactions (Ens 1992), making them an interesting and useful species for the study of long term roosting patterns. A deeper understanding of how Oystercatchers use and move between roosts will improve our ability to predict species adaption and therefore better plan mitigation activities.

Methods

The study area is located in North Wales in the vicinity of the Lavan Sands Special Protected Area. Lavan Sands is partly designated as an SPA due to it supporting 1.4% of the UK's overwintering Oystercatcher population (Defra 1992). This makes it a significant roost site, as it is the overwintering Oystercatchers that are of international conservation interest in the UK.

The SCAN Bird Ringing Group has collected an extensive set of Oystercatcher ringing data for this location from 1974 to 2012, including individual bird ring numbers and age at capture. The data was collected by cannon netting Oystercatchers throughout the winter ringing season. Any birds without rings were given metal identification rings with a unique identifying number. The ring number of each bird was recorded, along with age.

Once I received the data from SCAN I selected any birds that had been caught at least twice. I was then able to use the statistics program R to track where and when each Oystercatcher had been caught. I took this information and loaded it in to my mapping program, ArcGIS. I was then able to map the movements on a map of the Lavan Sand area.

After getting a general distribution, I decided to see if there were any differences between immature and adult Oystercatchers. To do this I used R to split my data into two categories. Birds that were juvenile or subadult (older than their first winter but not yet adult) I classified as immature. These birds were the first category. Adult birds were the second category. I re-mapped the Oystercatcher movements for both categories separately, producing an additional two maps.

I was also curious to see if there had been any noticeable changes in the way Oystercatchers were moving between sites over the last 40 years. To explore this I split the data into 5 year time periods, and then created a map for each of the seven time periods.

Results

Results for the whole dataset

Of the 21,423 Oystercatcher captures, 8,805 records represented birds caught more than once. As SCAN often target their capture sites to roost sites with large numbers of Oystercatchers present, I assumed capture sites were equivalent to roost sites. As you can see from the map shown in Figure 1, the roosts at Wig, Llanfairfechan and Penmon Quarry had large amounts of birds recaptured at the same site. There were also many bird movements between them. Cove and Bangor roosts had many movements to or from them, but fewer birds re-caught at the same site. There are many movements across the Menai Straits.

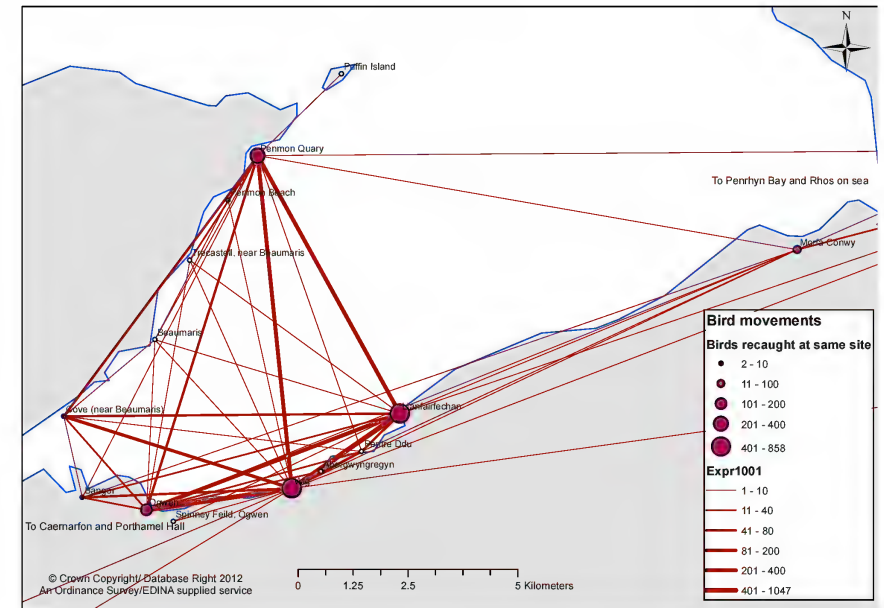


Figure 1. A map of the distribution of all the Oystercatcher movements between sites clustered around Traeth Lafan. The thickness of the line represents movements of birds between sites, and the size of the circle represents number of birds re-caught subsequently at the same site. © SCAN

Differences between roosting patterns of immature and adult Oystercatchers

Immature Oystercatchers were found to be more likely (55%) to move roost then remain, but utilised fewer roosts. See Figure 2 for the map showing spatial distribution. The roosts at Llanfairfechan, Wig and Ogwen were predominantly frequented by the immature birds.

Adults were more likely (65%) to remain at a roost site. Penmon Quarry roost site was used frequently, in addition to the Llanfairfechan, Wig and Ogwen roost sites frequently used by immature birds. The spatial distribution map can be seen in Figure 3 below.

Changes in roosting patterns over time

Roosting patterns were different for each time period, with the largest difference between 1995-2000 and 2000-2005. The results of these time periods will be discussed in detail below.

Between 1995 and 2000 none of the 653 documented movements between roosts were across the Menai Straits. Wig was the main roost site used during this period of time, with

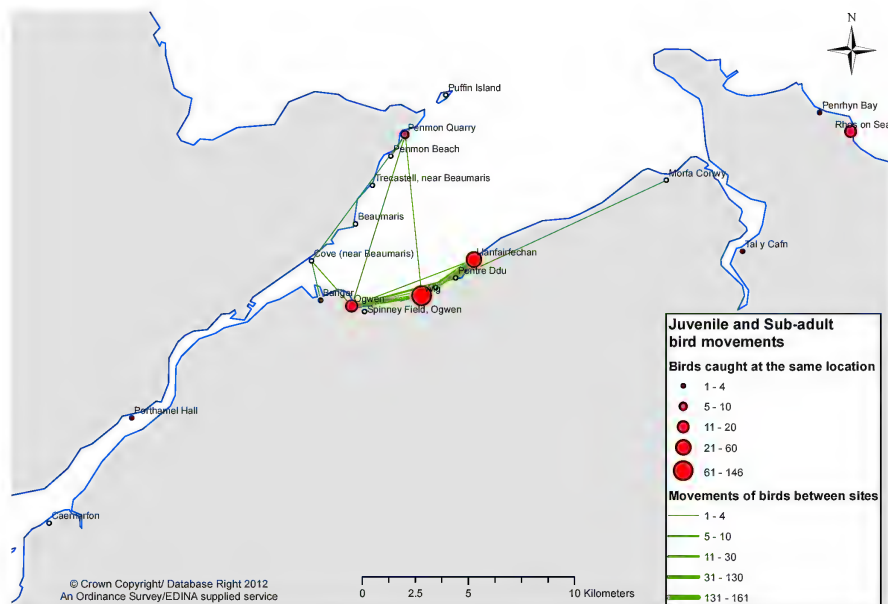


Figure 2. A map of the distribution of immature (juvenile and subadult) Oystercatchers. The thickness of the line represents movements of birds between sites, and the size of the circle represents number of birds re-caught subsequently at the same site. © SCAN.

birds also re-caught at Llanfairfechan and Ogwen. As seen in Figure 4, the majority of movements recorded were between these main sites.

Between 2000 and 2005, 212 of the 553 documented movements between roosts were across the Menai Straits. The roost at Penmon Quarry is used in this time period, unlike the time period between 1995 and 2000. According to my data 2000-2005 is in fact the first time period when Anglesey is populated by Oystercatchers. There are far more connections between sites during this time period than between 1995 and 2000 (Figure 5).

Discussion

The results, as seen in Figure 1, show that there is much intermixing of individuals within the Oystercatcher population of Lavan Sands. The Oystercatchers are functioning as a single population. Interestingly, they were more likely to be re-caught at the same site than move to another site. This site faithfulness is likely due to the fact that Oystercatchers are at a disadvantage in new feeding areas (Rutten *et al.* 2010). They become specifically adapted to the individualities of their preferred feeding locations (Goss-Custard 1996). Keeping the distance between roost sites and feeding ground at a minimum is important for survival, especially during severe winter weather conditions (Davidson *et al.* 1991).

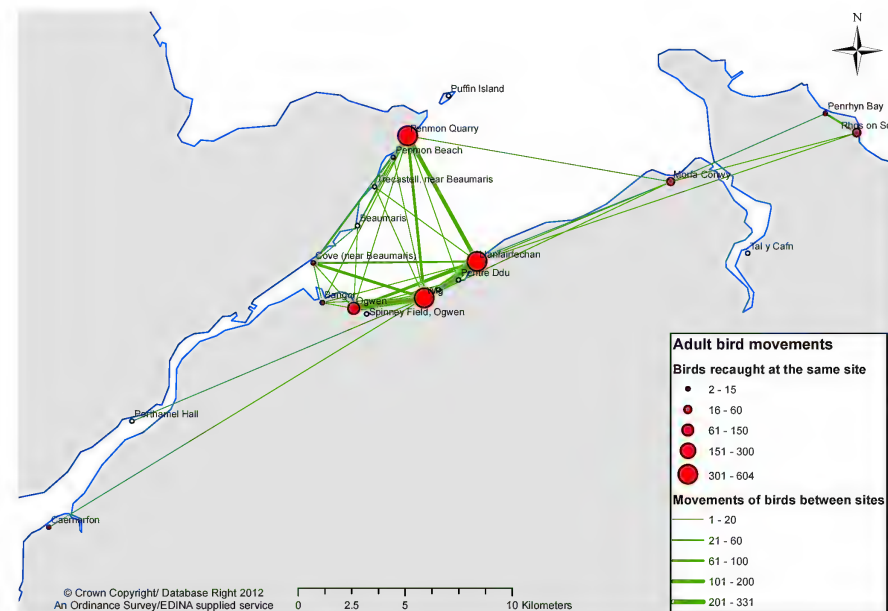


Figure 3. A map of the distribution of adult Oystercatchers. The thickness of the line represents movements of birds between sites, and the size of the circle represents number of birds re-caught subsequently at the same site. © SCAN.

As such, a suitable roosting location close to feeding grounds is unlikely to be abandoned lightly. This information is useful as we now know that the Oystercatchers at Lavan Sands are able to move between sites if necessary but they would prefer to remain at the original roost site.

The immature Oystercatchers were more likely to move site than be re-caught at the same site, whereas adults were more likely to be site faithful. Immature Oystercatchers are subordinate to adults when feeding, and often move from areas when in competition with adults (Goss-Custard *et al.* 1982). Food shortages may have driven the immature birds to seek new feeding locations, and so caused them to change roost. As the majority of birds in this dataset were adults, it is to be expected that their distribution mirrors that of the entire dataset.

The distribution of Oystercatchers has not remained static during the research period. As can be seen when comparing Figures 4 and 5, the birds are using more sites during the later time period. As the adults are generally site faithful, it may be speculated that something must be causing them to move to previously unoccupied roosts. Potential causes include greater disturbance, local shellfish dredging and extreme weather. Unfortunately, evaluating these possibilities was beyond the scope of this study.

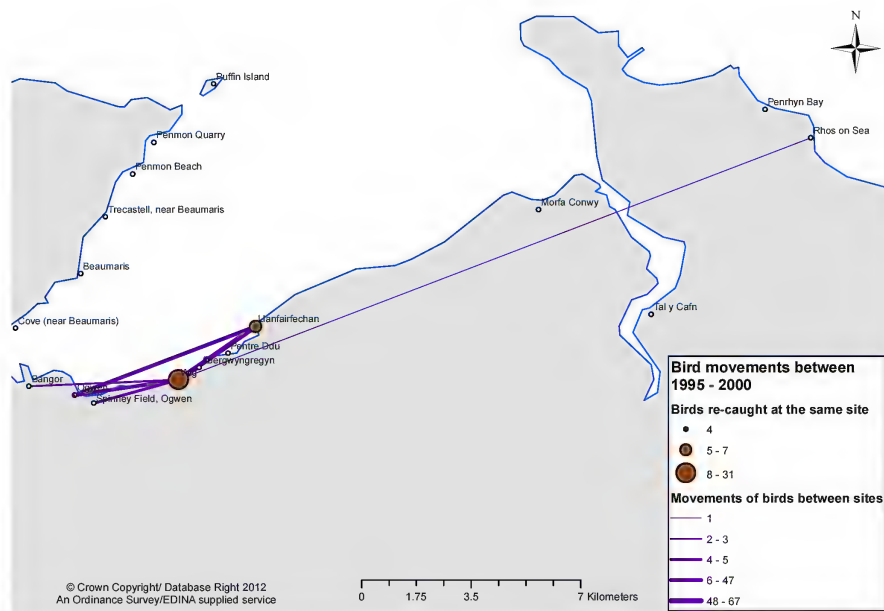


Figure 4. A map of the distribution of Oystercatchers between 1995 and 2000. The thickness of the line represents movements of birds between sites, and the size of the circle represents number of birds re-caught subsequently at the same site. © SCAN.

Acknowledgements

I would like to thank the SCAN bird ringing group for their data, BTO Wales for their technical support, Ian Harris my Bangor University supervisor for all his guidance, and the Welsh Ornithological Society for my award.

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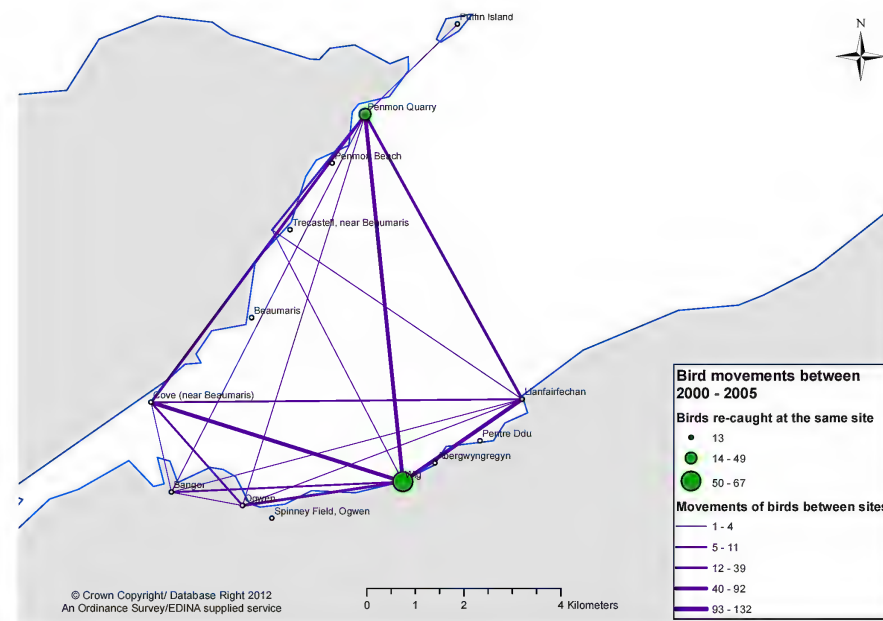


Figure 5. A map of the distribution of Oystercatchers between 2000 - 2005. The thickness of the line represents movements of birds between sites, and the size of the circle represents number of birds re-caught subsequently at the same site. © SCAN.

Success Of The Oystercatcher. Groningen.

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Juvenile survival, pre-breeding dispersal and natal fidelity of Red-billed Choughs on the Llŷn Peninsula, Gwynedd

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Summary

A twenty four year colour-ringing study of Choughs in north and mid-Wales has provided valuable data for the species on the Llŷn peninsula, North Wales. These data are being used to help inform the development of a landscape-scale conservation programme, as the chough population on the Llŷn has declined by at least 11.7 % between the two National SCARRABBS¹ survey years of 2002 and 2014. Between 1991 and 2013, a total of 1,281 Chough nestlings were individually colour-ringed on the Llŷn, as part of the wider project. Re-sightings of these, and of others ringed elsewhere in Wales and seen on the Llŷn, show that only 23.2% of chicks ringed survive until the next calendar year, but following this, annual survival rates improve to approximately 70%. Post fledging dispersal of Llŷn-bred choughs include movements both within and beyond the boundaries of the Llŷn. The upland pastures and mountains of Snowdonia hold some significant autumn foraging areas, where flocks of up to 80 individuals have been recorded, including Llŷn-bred young birds as well as those from other areas. Changes in farming practices (reduction in stocking densities, changing seasonal regimes of stock-grazing and also abandonment of upland pastures) are probably responsible for the disappearance of autumn flocks from some areas, and a more mobile foraging strategy than in the recent past. Winter foraging locations are typically coastal (e.g. beaches, dunes and soft rock cliffs). Adult dispersal distances from natal site to breeding site is markedly different between the sexes, with females moving on average 23.2 km and males only 10.1 km. This dispersal strategy results in some Llŷn birds (the majority being males) entering the local breeding population, but also both immigration and emigration into and away from the Llŷn.

Crynodeb

Mae astudiaeth dros bedair blynedd ar hugain o osod modrwyon lliw ar Frain Coesgoch yng ngogledd a chanolbarth Cymru wedi darparu gwybodaeth werthfawr am y rhywogaeth yma ar benrhyn Llŷn, Gogledd Cymru. Defnyddir y data wrth ddatblygu rhaglen gadwraeth ar raddfa dirwedd, gan fod poblogaeth y Frân Goesgoch yn Llŷn wedi lleihau o leiaf 11.7

% rhwng y ddau arolwg SCARRABBS¹ cenedlaethol yn 2002 a 2014. Rhwng 1991 a 2013, gosodwyd modrwyon lliw ar gyfanswm o 1281 o gywion Brain Coesgoch fel rhan o arolwg fwy. Dengys adroddiadau am ail-weld y rhain, ac am weld adar a fodrwywyd mewn mannau eraill yng Nghymru, mai dim ond 23.2% o'r cywion a fodrwywyd sy'n goroesi tan y flwyddyn galendr nesaf, ond wedi hynny mae'r raddfa goroesi flynyddol yn gwella i tua 70%. Mae gwasgariad Brain Coesgoch a fagwyd yn Llŷn wedi iddynt adael y nyth yn cynnwys symudiadau o fewn Llŷn a thu hwnt. Yn yr hydref, mae rhai o borfeydd uchel a mynyddoedd Eryri yn fannau pwysig i chwilio am fwyd, a chofnodwyd heidiau o hyd at 80 o unigolion yma, yn cynnwys adar ieuanc o Lŷn yn ogystal â rhai o ardaloedd eraill. Newidiadau mewn amaethu (lleihad mewn dwysedd stocio, newidiadau ym mhatrwm tymhorol pori a hefyd rhoi'r gorai i borfeydd ucheldir) sydd i bob tebyg yn gyfrifol am ddiffianiad heidiau yn yr hydref o rai ardaloedd, a mwy o symud o gwmpas i fwydo nag yn y gorffennol diweddar. Fel rheol mae mannau hel tamaid yn y gaeaf o gwmpas yr arfordir (e.e. traethau, twyni tywod a chlogwyni o graig feddal). Ceir gwahaniaeth amlwg rhwng y ddau ryw yn y pellter y maent yn gwasgaru rhwng y man geni a'r man nythu, gyda'r ieir yn symud 23.2 km ar gyfartaledd, a'r ceiliogod dim ond 10.1 km. Mae'r strategaeth wasgaru yma'n golygu fod rhai adar o Lŷn (y mwyafrif yn geiliogod) yn dod yn rhan o'r boblogaeth nythu leol, ond bod hefyd fewnfudo ac allfudo.

Introduction

The Red-billed Chough *Pyrrhocorax pyrrhocorax* (hereafter referred to as the Chough) is the scarcest member of the crow family (Corvidae) to be found in Britain and Ireland and the only one listed on Schedule 1 of the Wildlife and Countryside Act. It is an Annex 1 species of the European Commission Birds Directive and also a species of principal importance for conservation of biological diversity in Wales². In the Western fringes of its range (Ireland, Scotland, Wales and Brittany), it is predominantly associated with coastal areas, but is largely a montane species in the rest of its range. However, a small but declining inland population still exists in Snowdonia, nesting mainly in old mineshafts and slate caverns, having become extinct in Montgomeryshire and all but extinct in inland Ceredigion in recent history. Unusually for a corvid, the species is a specialist feeder of soil invertebrates (in Wales, particularly the larvae of Crane flies Tipulidae, Welsh Chafers *Hoplia philanthus* and ants Formicidae) and is highly associated with short-grazed pastures or impoverished soils.

In 1991, the authors began a programme of nest-monitoring and colour-ringing in mid-Wales to study juvenile dispersal and natal fidelity in both coastal and inland-reared Choughs. The aim was to determine to what extent the populations were geographically distinct and to quantify the level of interaction between coastal and inland populations. The scale of the project rapidly expanded to include the majority of accessible nests in the whole of mid and North Wales, north of Cardigan. By the end of 2014, nearly 5,000 nestlings and 146 adult/juvenile Choughs had been individually colour-ringed, with information gathered from more than 26,000 subsequent positive identifications of individually recognisable birds. During the same interval, around 3,600 nesting attempts

1. SCARRABBS: Statutory Conservation Agencies/RSPB Rare Breeding Birds Survey

2. Section 42 of the Natural Environment and Rural Communities Act 2006



Figure 1. The Llŷn study area for the purpose of this paper.

at over 250 different nest-sites were monitored. The number of probable or confirmed nesting attempts found fluctuated around 160 per annum, this millennium, peaking at 180 in 2009 (while in the 1990s, the numbers recorded were much lower, probably largely due to many of the regularly-used sites being unknown at that time). The majority of the nesting adults were also checked for colour-rings and individuals identified.

For the purposes of this paper, the Llŷn Peninsula in North Wales is defined as the area to the west of a line running from Caernarfon on the north coast to Criccieth on the south, also including Bardsey Island (Fig. 1). For the wider study area, the bulk of the data for the period spanned by this project has yet to be analysed, but this preliminary analysis of the Llŷn subset of the data between 1994 and 2013, was undertaken to help inform land-management decisions by the National Trust on the Llŷn Peninsula through its

involvement in the Llŷn Coastal Partnership.³

The Llŷn Peninsula, with its mild western seaboard climate and predominance of close-grazed grasslands and coastal heaths, is an important stronghold for Chough in the UK. Its importance is recognised by its two SPAs (Special Protection Areas) for Choughs, namely the Aberdaron and Cilan SPAs. This study area contains approximately 90 known nesting “territories” with a larger number of actual nest-sites, as some contain alternative sites for the same pair.

The Llŷn population constitutes just over a quarter of the known Welsh population of 228 breeding pairs or about 14% of the UK and Isle of Man population of 429 breeding pairs (Johnstone *et al.* 2007). The National Trust owns or manages the land at approximately 25% of the Llŷn sites, making it the most important land manager for Choughs in this species’ stronghold.

The current colour-ringing project did not extend to include the Llŷn until 1994, although Choughs had previously been colour-ringed on Bardsey and its neighbouring coastline by Peter Roberts (Roberts 1985). Between 1991 and the end of 2013, a total of 1,281 nestlings (all but one of these ringed in the 1994-2013 period) and 44 adult/fledged juvenile Choughs had been colour-ringed on the Llŷn, in the area outlined in Fig. 1 (these totals include 169 nestlings and 13 adults/fledged juveniles ringed by the Bardsey Bird and Field Observatory). In recent years, approximately 70 nestlings have been ringed *per annum* on the Llŷn (including both Bardsey and mainland).

Methods

Many Chough nest-sites are traditional, some in continuous occupation for many decades. Each year, most of these traditional sites and many potential alternatives, were checked for occupancy. This task is made easier by the fact that most of the suitable breeding habitat on Llŷn is confined to the coast, so is linear in nature. Choughs are quite noisy away from the nest-site and feeding birds are usually fairly easy to locate and watch back to their nest-sites.

Whilst locating nests is fairly easy, accessing them is not as straightforward. Chough nests are renowned for being positioned in some fairly inaccessible locations. The birds prefer cavities in precipitous cliffs, ledges high in sea-caves, slate caverns or mine shafts as nest-sites. Occasionally, they may choose nest-sites in buildings, although in Wales, the extent of this is limited. Nests were variously accessed using ropes, ladders, boats, or often a combination of these. Many nest-sites were deemed inaccessible by virtue of being too high up in a sea cave, too deep into a rock fissure, in rock faces that were dangerously loose and crumbly, or too close to colonies of cliff-nesting sea-birds to be

³ Llŷn Coastal Partnership - a partnership of statutory agencies, environmental and community organisations; led by Gwynedd Council and including Natural Resources Wales (NRW), National Trust and RSPB. Cadw'r Lliw yn Llŷn project ran for four years before the landscape partnership was successful in gaining a Heritage Lottery Fund (HLF) grant for a range of projects including heathland and coastal management and new walks linked to the coastal path. The HLF grant is now running to a close.

possible to access without causing disturbance to the latter.

At all nests accessed, chicks were fitted with a British Trust for Ornithology metal ring plus a combination of three colour-rings, allowing subsequent individual recognition in the field.

For every active nest, an attempt was made to identify any colour-ringed adults involved. Unfortunately, time did not always allow for all breeding adult Choughs to be identified, as they were found to leave the nest on foraging trips for anything from 30 minutes to over 2 hours, often flying straight back to the nest without perching in view or giving any opportunity to read their rings.

Details of each ringed individual - its origin, ringing biometrics, subsequent re-sightings, distances travelled, any partners identified and any nesting attempts, as well as nest histories of all known sites, were recorded on Excel spreadsheets.

Results

Nesting attempts monitored

Each nesting season, an attempt was made to monitor as many of the approximately 90 nesting "territories" (some of which contain several alternative nest-sites) on the Llŷn as possible, for evidence of breeding and to identify any colour-ringed nesting adults.

A National Survey method (currently SCARRABBS - Chough survey method) involves two visits within given time periods, but our coverage in any year has varied from this, as has our use of the criteria for assessing "Confirmed", "Probable" and "Possible" nesting attempts, to allow for greater insight provided by having many individually identifiable birds (> 50%) and our accessing of nest sites. As a result figures in this paper may vary from the published National Survey figures for 2002 and 2014.

Examples of how we consider the methods/criteria we have used are more accurate than the two-visit National survey include:

- Where a known nest-site might be accessed and found to contain a failed, freshly-lined nest, but with no sign of any activity from the failed adult pair – this has been counted as a positive nest attempt, but would not have qualified as such by National survey criteria.
- Where clustering of nest-sites occurs (as may happen within quarries, or parts of the coast where nest-site availability may be limited to a short section of good cliff) it is very easy to overlook some nest attempts under the "activity-shadow" of their close neighbours. Having the luxury of at least one identifiable colour-ringed bird in the majority of nesting pairs, allows for better separation of close-nesting neighbouring pairs. Conversely, it allows enthusiastic carrying of nest-material to random unsuitable sites by identifiable first year birds "practising" nesting, to be dismissed, while under National survey criteria, this would have qualified as a probable nest attempt. Additionally, because near perfect coverage is seldom achieved, having many

identifiable pairs allows for deducing a nest attempt from a family party seen elsewhere, or for interim years between observed nest attempts from the same pair. (i.e. a pair observed nesting at a site in years X and Z can safely be assumed to have made some sort of nest attempt, either at the same site or a close alternative in year Y, even in the absence of a site visit). When the same identifiable pair has more than one nest attempt in one season, after early failure, it has only been counted once, while by National survey criteria, two attempts at different sites would both be counted.

- Where it has not been possible to visit a site that was occupied in the preceding and following years, then it is counted as a "possibly occupied site". This means that the maximum and minimum lines on the graph of occupied sites (Fig. 2) diverge most widely in years of poorer coverage, and converge more closely in years with the best coverage, but gives a better indication of the population level than the observed sum of the probable and confirmed nest attempts.

From Figure 2, it can be seen that there is an apparent increase in occupancy rates from 1994 up to 2002, when numbers peak and then plateau for a few years until 2009. Thereafter, the occupancy rates decline again through the years up to and including 2014 with a very slight increase in 2015. The authors consider that most, if not all, of the apparent increase in occupancy rates in the 1990s is a result of the annually increasing accrued knowledge of nest-sites, including alternative sites and previously under-counted nest clusters, rather than a real increase in breeding pairs. However, the recent downward trend of the graph is almost certainly a true reflection of how Llŷn Choughs have been faring this decade. In addition, both the level and thoroughness of nest monitoring have never been greater than that undertaken in the 2014 and 2015 seasons, as evidenced by the close convergence of the maximum and minimum range lines of the graph.

Comparing 2002 and 2014 (both with good coverage due to National surveys), chough occupancy on the Llŷn has fallen by at least 11.7% (reduction in total of confirmed and probably occupied sites from 60 to 53 nests), but possibly by as much as 20% if "possibly occupied sites" are included.

Breeding success

Choughs, largely by virtue of their sheltered and inaccessible nest-sites, are highly successful breeders. Predation rates are low and the main causes of nest failure are weather related, either with chicks dying in exceptionally cold and wet weather or nests being swamped by a combination of high tides and stormy seas. An analysis of breeding success for the study population as a whole will be the subject of a future paper.

Post-fledging survival rates

Practised adult Choughs seem capable of rearing young under most weather conditions, but the subsequent survival of young birds shows large between-year variations. Immediately post-fledging is the period of highest mortality.

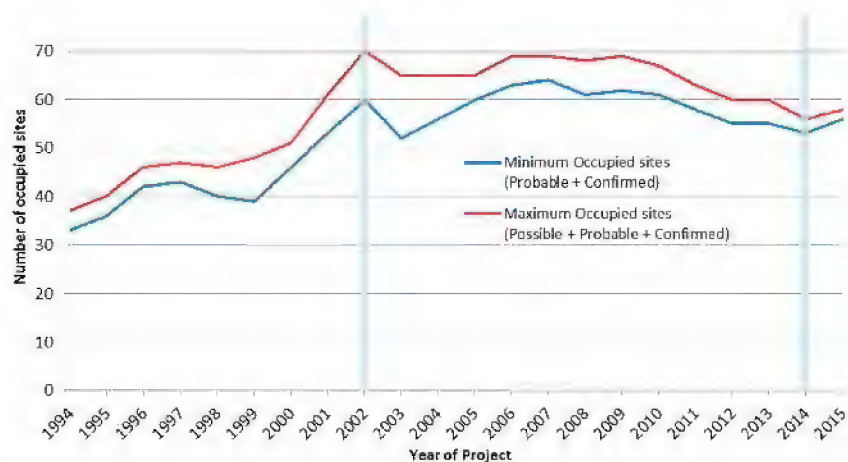


Figure 2. Number of occupied sites from 1994 - 2015 (Minimum totals exclude “possibles”, Maximum totals include “possibles”. Vertical bars mark years of SCARRABBS national surveys.

Between 1991 and the end of 2013, a total of 1,281 nestlings were ringed on the Llŷn, all but one of these in the 1994-2013 period (grey background bars in Fig. 3).

Over the past 20 years, the mean percentage of Llŷn colour-ringed chicks that are never recorded again after ringing is 47.2% (Figs. 3, 4 and “zero-line” of Fig. 5). For a few days after leaving the nest, fledgling Choughs have a period of ‘bouldering’ akin to the ‘branching’ stage of tree-nesting corvids. During this bouldering stage, the young are left behind by their foraging adults and seek safety in rock fissures, rabbit burrows or under large boulders. Young birds attempting to boulder in the bottom of sea-caves have been recorded swamped by rising tides. Some nesting caves have remarkably sheer and slippery walls which give little opportunity for perching when the chicks first leave the nest and this, too, can lead to young birds sliding down into the sea and drowning. Once out of the nest-site, inexperienced juveniles beg incessantly from the adults and often attract the attentions of, and fall prey to, predators such as Peregrines *Falco peregrinus*, Buzzards *Buteo buteo*, Ravens *Corvus corax*, large gulls Laridae and even Foxes *Vulpus vulpus* (pers. obs.).

Having survived the dangers of fledging, the juvenile birds need to acquire the foraging skills necessary to become independent. Within only a very few weeks of fledging, most but not all family groups seem to move away from the coastal areas and into inland and upland pastures (Table 4 and Figs. 6 and 7 maps). Here, they may be seen on high mountain slopes in Snowdonia, exploiting the August abundance of bilberries, interspersed with more typical foraging on grazed upland pastures. In a typical year, the damper mountain slopes with autumn gluts of emerging craneflies are a more hospitable habitat for young Choughs than their natal coastal heaths and pastures, which are likely to have dried out and become too hard for optimum feeding by late summer. It seems

that the adult pairs cannot afford to be absent from their nest territories for long, and having deposited their young in the communal flock, quickly return to the coast without them.

Even with the benefit of the pooled knowledge of preferential feeding areas provided by the non-breeding flock, mortality rates continue to be high throughout the first autumn and only 23.2% of chicks ringed reach the following calendar year, at around 6 months old (Line 1 of Fig. 5). With the young birds having improved their foraging and predator-avoidance skills, their annual survival rates increase substantially to approximately 70%, with a mean of 16% of the original cohort surviving into their 3rd calendar year, at around 18 months of age (Line 2 of Fig. 5).

The lines in Figure 5 show the relative survival of the different annual cohorts, as measured by re-sightings of individuals. Some years’ cohorts clearly survive much better than others e.g. 1996, 2002, 2004, 2006, 2011 and 2013 were notably better than the poor years of 1999, 2003, 2005, 2007 and 2009. While some of the variation in the apparent survival rate in the immediate post-fledging to end of first year period could be due to an observer effect i.e. how quickly after fledging the young are looked for and identified, this is clearly not the full explanation, as the “good year” cohorts continue to be better represented than average in the subsequent periods of their second and third calendar years. It appeared that juvenile survival was noticeably poorer than average when the summer was either very wet or very dry. Analyses of the effects of various weather factors on juvenile survival are planned for future study.

Use of wider landscape by Llŷn-bred choughs

Choughs utilise different habitats and geographic areas throughout the year, influenced by the seasonality of various food resources, overlaid by social factors (Table 4). There is a tendency to gather into large autumn flocks and communal roosts, where young birds learn feeding strategies from other members of the flock and start to form preliminary pair-bonds. The locations of these larger flocks are not constant over a period of years, although all are usually within about a half-hour’s flight radius of a suitable roost site, either a cliff, quarry or rock outcrop offering shelter and safety. The authors used to regard such roost sites as traditional, but have found these to be more dynamic across a larger number of years. Small variations in flock location may be explained by the cyclical abundance of some of the Chough’s invertebrate food, where a heavily exploited field may take several years for the number of Tipulid larvae to recover, resulting in the flock moving locally to forage on alternative areas. Larger changes, such as the disappearance of a regular autumn flock from a whole valley or mountain area, are more likely to be linked to a broad scale change of stock husbandry, particularly the introduction of lower stocking rates over wide areas. Such reductions in stocking density result in longer swards of rank and “thatchy” grass combined with an increasing dominance of bracken or gorse. The resulting reduction in the availability of soil invertebrates, alongside reduction of animal dung with its associated dung invertebrates, may ultimately lead to site abandonment.

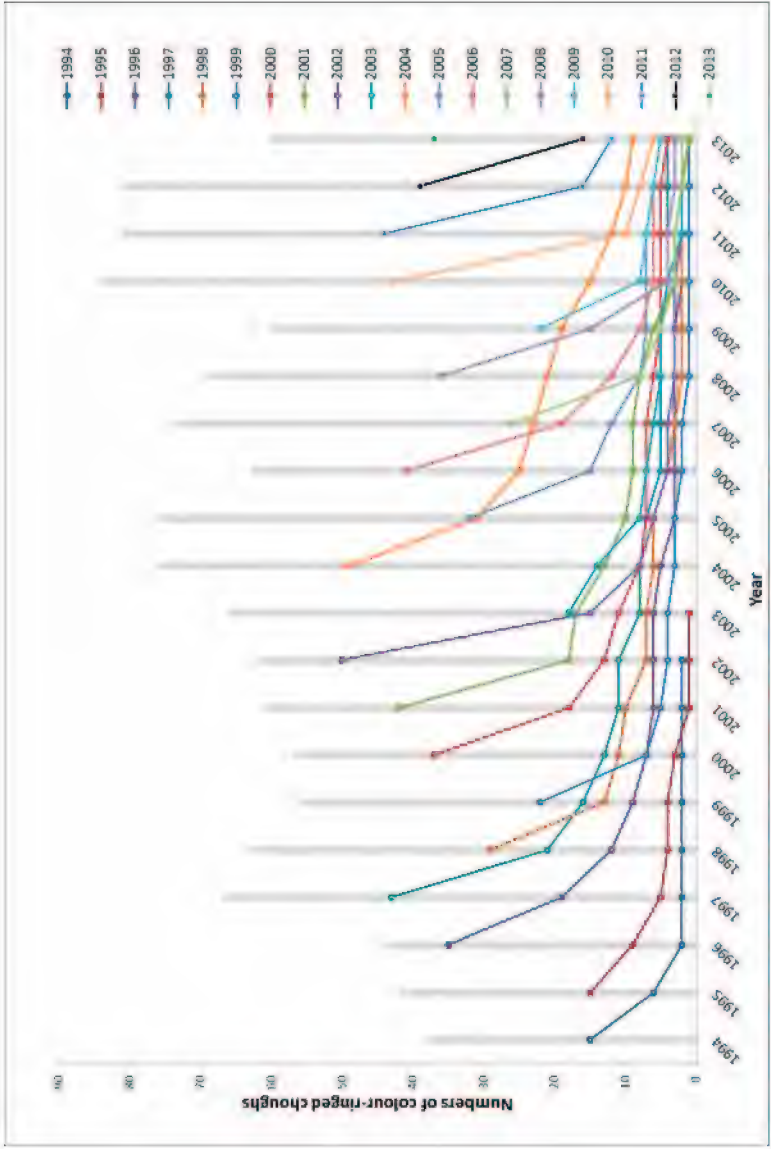


Figure 3. Line graph of numbers of Llŷn colour-ringed Choughs re-sighted per year by cohort (grey bars represent total pulli ringed by year).

Annual cohort	Number ringed	Year of re-sightings																								
		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013		
1991	1	1	1	1	1	1	1	1	1	1	1	1														
1992	0																									
1993	0																									
1994	38				15	6	2	2	2	2	2	2	2													
1995	42					15	9	5	4	4	3	1	1	1												
1996	44						35	19	12	9	7	6	6	6	5	3	3	3	3	2	2	2	2	1		
1997	67							43	21	16	13	11	11	8	8	7	5	5	5	4	4	4	4	4		
1998	63								29	13	11	10	7	7	6	6	4	3	2	2	2	2	2	2		
1999	56									22	7	5	4	4	3	3	2	2	1	1	1	1	1	1		
2000	57										37	18	13	11	8	7	7	7	6	5	5	5	5	4		
2001	61											42	18	17	13	10	9	9	8	6	3	3	2	1		
2002	62												50	15	8	6	4	4	3	3	3	2	2	2		
2003	66													18	14	8	7	6	5	5	4	2	2	2		
2004	76														49	31	25	23	21	19	15	12	10	9		
2005	76															32	15	12	8	7	7	7	6	5		
2006	63																41	19	12	8	6	6	6	5		
2007	74																	26	8	5	3	3	2	2		
2008	69																		36	15	4	4	3	3		
2009	60																			22	8	7	6	5		
2010	84																				43	10	8	6		
2011	81																					44	16	12		
2012	81																						39	16		
2013	60																							37		
Total:	1281																									

Table 1. Numbers of Llŷn colour-ringed Choughs re-sighted each year by cohort.

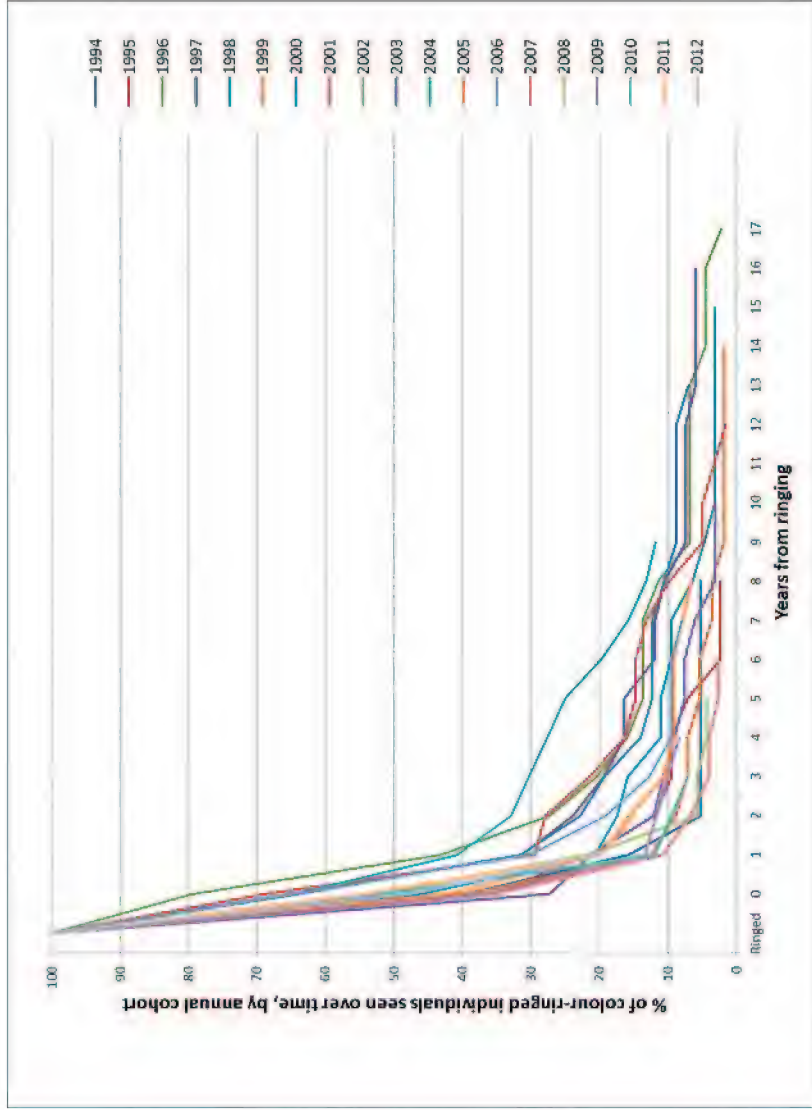
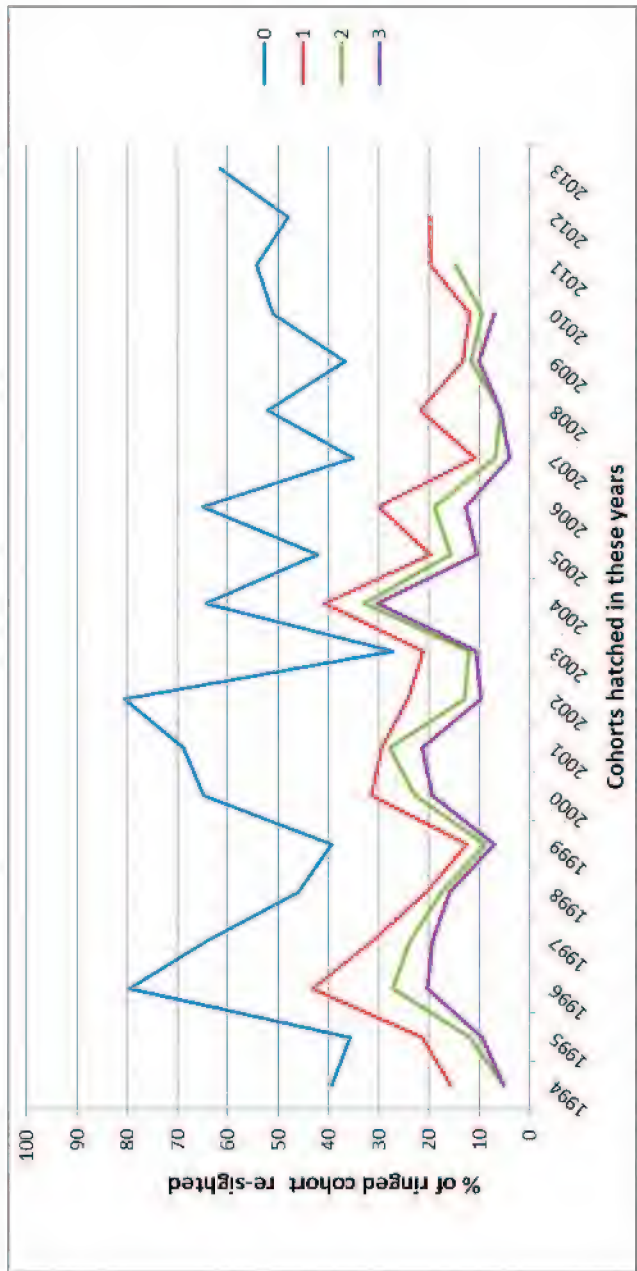


Figure 4. Line graph showing the percentage of Llyn colour-ringed Choughs re-sighted through time by cohort. (= indexed apparent losses of colour-ringed individuals over time, by cohort).

Annual cohort	Number ringed	% Years of birds' lives																		
		Ringed	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1994	38	100	39	16	5	5	5	5	5											
1995	42	100	36	21	12	10	10	7	2	2	2									
1996	44	100	80	43	27	20	16	14	14	14	11	7	7	7	7	5	5	5	5	2
1997	67	100	64	31	24	19	16	16	12	12	10	7	7	7	7	6	6	6	6	6
1998	63	100	46	21	17	16	11	11	10	10	6	5	3	3	3	3	3	3	3	3
1999	56	100	39	13	9	7	7	5	5	4	4	2	2	2	2	2	2	2	2	2
2000	57	100	65	32	23	19	14	12	12	12	11	9	9	9	9	7				
2001	61	100	69	30	28	21	16	15	15	13	10	5	5	3	2					
2002	62	100	81	24	13	10	6	6	5	5	5	3	3	3						
2003	66	100	27	21	12	11	9	8	8	6	3	3	3							
2004	76	100	64	41	33	30	28	25	20	16	13	12								
2005	76	100	42	20	16	11	9	9	9	8	7									
2006	63	100	65	30	19	13	10	10	10	8										
2007	74	100	35	11	7	4	4	3	3											
2008	69	100	52	22	6	6	4	4												
2009	60	100	37	13	12	10	8													
2010	84	100	51	12	10	7														
2011	81	100	54	20	15															
2012	81	100	48	20																
2013	60	100	62																	

Table 2. The percentage of Llyn colour-ringed Choughs re-sighted through time by cohort where Year 0 = hatch year, Year 1 = 2nd calendar year, Year 2 = 3rd calendar year, etc.



- 0 % of ringed cohort seen fledged (recorded at any time after fledging, i.e. fledged record in/after year of ringing)
- 1 % of ringed cohort seen/known to be alive in/after 2nd calendar year (i.e. pass 1st Jan mark, > c 6 months old)
- 2 % of ringed cohort seen/known to be alive in/after 3rd calendar year (i.e. pass 1st Jan mark, > c 18 months old)
- 3 % of ringed cohort seen/known to be alive in/after 4th calendar year (i.e. pass 1st Jan mark, > c 30 months old)

Figure 5. Line graph showing the percentage of Llyn colour-ringed Choughs re-sighted, surviving into their 2nd, 3rd and 4th calendar years by cohort.

Annual cohort	Number ringed	% Ringed	Years of birds' lives			
			0	1	2	3
1994	38	100	39	16	5	5
1995	42	100	36	21	12	10
1996	44	100	80	43	27	20
1997	67	100	64	31	24	19
1998	63	100	46	21	17	16
1999	56	100	39	13	9	7
2000	57	100	65	32	23	19
2001	61	100	69	30	28	21
2002	62	100	81	24	13	10
2003	66	100	27	21	12	11
2004	76	100	64	41	33	30
2005	76	100	42	20	16	11
2006	63	100	65	30	19	13
2007	74	100	35	11	7	4
2008	69	100	52	22	6	6
2009	60	100	37	13	12	10
2010	84	100	51	12	10	7
2011	81	100	54	20	15	
2012	81	100	48	20		
2013	60	100	62			

Table 3. The percentage of Llyn colour-ringed Choughs re-sighted through time by cohort where Year 0 = hatch year, Year 1 = 2nd calendar year, Year 2 = 3rd calendar year, etc showing only Years 0-3. The coloured percentages relate to the coloured lines in Figure 5.

The autumn flocks peak in numbers in September/October, with maximum flock size up to about 80 birds, but typically less than half that many. Large flocks tend to contain mostly birds of the year, with a smaller number of second year and older birds, along with any local adult pairs. There are examples of smaller flocks/roosts consisting almost entirely of two-year old birds. Colour-ringing has shown that these flocks act as a meeting point for birds from different natal areas, with more from closer areas and progressively fewer from more distant natal areas up to 60+ km distant.

In late autumn, large flocks tend to break up into smaller groups that are harder to relocate. As previously mentioned, young Choughs are also subject to very high mortality and many are never seen again after these flocks disperse. Of the ones that are relocated during the colder winter weather, the favoured areas are the soft boulder-clay cliffs of the north Llŷn coast (Nefyn, Clynnog, Aberdesach, Pont Llyfni and Dinas Dinlle), and beaches (mainly Solfach on Bardsey, but also others such as Traeth Penllech) and coastal pastures and grazed dune systems (e.g. Newborough Warren, Aberffraw and Morfa Dyffryn). On the beaches and soft cliffs, the main food items appear to be sand-hoppers and kelp flies. By the following spring, small numbers of the previous year's youngsters may be seen around their natal, coastal areas. The pattern often seems to be repeated in the second calendar year for the surviving members of the cohort – a phenomenon dubbed the “double yo-yo effect” by the authors.

Generally, only small but representative numbers of colour-ringed young Llŷn-bred Choughs are identified in each of the feeding areas/flocks shown in Figures 6 and 7, but the pattern of usage has changed gradually over two decades of observations (Table 4), in line with the general trends of Chough flock sizes in these areas.

Some areas have been used fairly consistently over time – the Trefor/Llanaelhaearn area, north Llŷn coast and the close-grazed mountain pastures of the Nantlle Valley/Drws y Coed, the north coastal commons around Penmaenmawr and Anafon Valley, as well as the areas around the coastal natal sites of Aberdaron and Cilan SPAs. Other areas that were previously frequented by large flocks including Llŷn-bred birds, from the mid 1990s to the early 2000s, but have fallen into decline include Nant Peris (regularly peaking at around 60 birds in autumns of 1997 to 2001), Nant Ffrancon (peaking at 60–65 in summer 2001), Cwm Llan (40 in 2001), Llyn Cwellyn (40 in autumn 1995) and Cwmystradllyn (regular large flocks and roost, up to 55 in 2001 and 2002, but down to single figures since 2011). In recent years, more late autumn/winter feeding flocks have been observed in areas of grazed dune and dune slack, especially following periods of flooding e.g. Morfa Dyffryn (up to 17 in 2013), Newborough Warren (up to 27 in 2013) and Aberffraw (up to 26 in 2009).

The authors are painfully aware that, as the main and sometimes only observers, uniformity of coverage across such a large area cannot be achieved or maintained. Our compromise is to concentrate on the repeating patterns: visiting the same areas at the same times of year as frequented in previous years and also being very quick to follow up any new leads from third parties, for which we are very grateful.

For “new” or previously unknown feeding areas, we are not always able to distinguish

between genuinely new areas and those that may have been in use for an unknown period before we were aware of them.

Chough feeding area	Cohort																			
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Anglesey																				
1 Penmon																				
2 North East Anglesey																				
3 Carmel Head																				
4 South Stack																				
5 Rhoscolyn																				
6 Aberffraw																				
7 Newborough Warren																				
Llŷn																				
8 Clynnog to Dinas Dinlle																				
9 Nefyn, Trefor & Llanaelhaearn																				
10 Traeth Penllech																				
11 Aberdaron																				
12 Bardsey																				
13 Rhiw / Perarfynydd																				
14 Cilan																				
15 South Llŷn coast																				
Mountains and Inland																				
16 Nantlle Valley / Drws y Coed																				
17 Llyn Cwellyn																				
18 Snowdon / Cwm Llan																				
19 Llanberis / Nant Peris																				
20 Nant Ffrancon + Carneddau																				
21 Llanllechid & Moel Wnion																				
22 Aber / Anafon Valley																				
23 Penmaenmawr																				
24 Conwy Mountain																				
25 Great and Little Orme																				
26 Cwmystradllyn																				
27 Prenteg																				
28 Cwm Croesor																				
29 Blaenau Ffestiniog																				
30 Craig yr Aderyn																				
Meirionnydd & Ceredigion coasts																				
31 Morfa Dyffryn																				
32 Barmouth + Friog																				
33 Tonfanau / Beacon Hill																				
34 Ynyslas																				
35 Ceeredigion coast																				

Table 4. Feeding areas, shaded, used by different cohorts (numbers refer to map in Figure 6). NB Neither the Ormes nor Ynyslas were used by Llŷn-bred birds.99

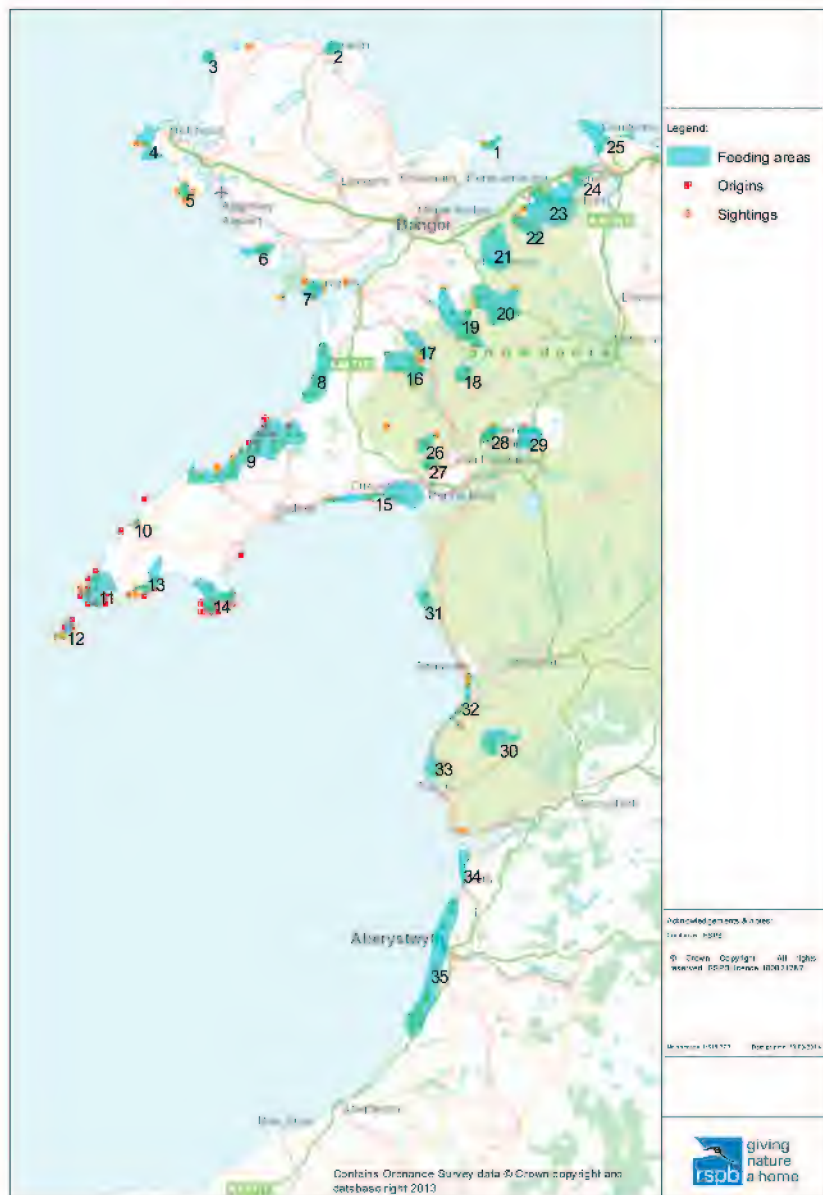


Figure 6. Map of feeding areas used by Llŷn-bred Choughs throughout the study period (listed in Table 4).

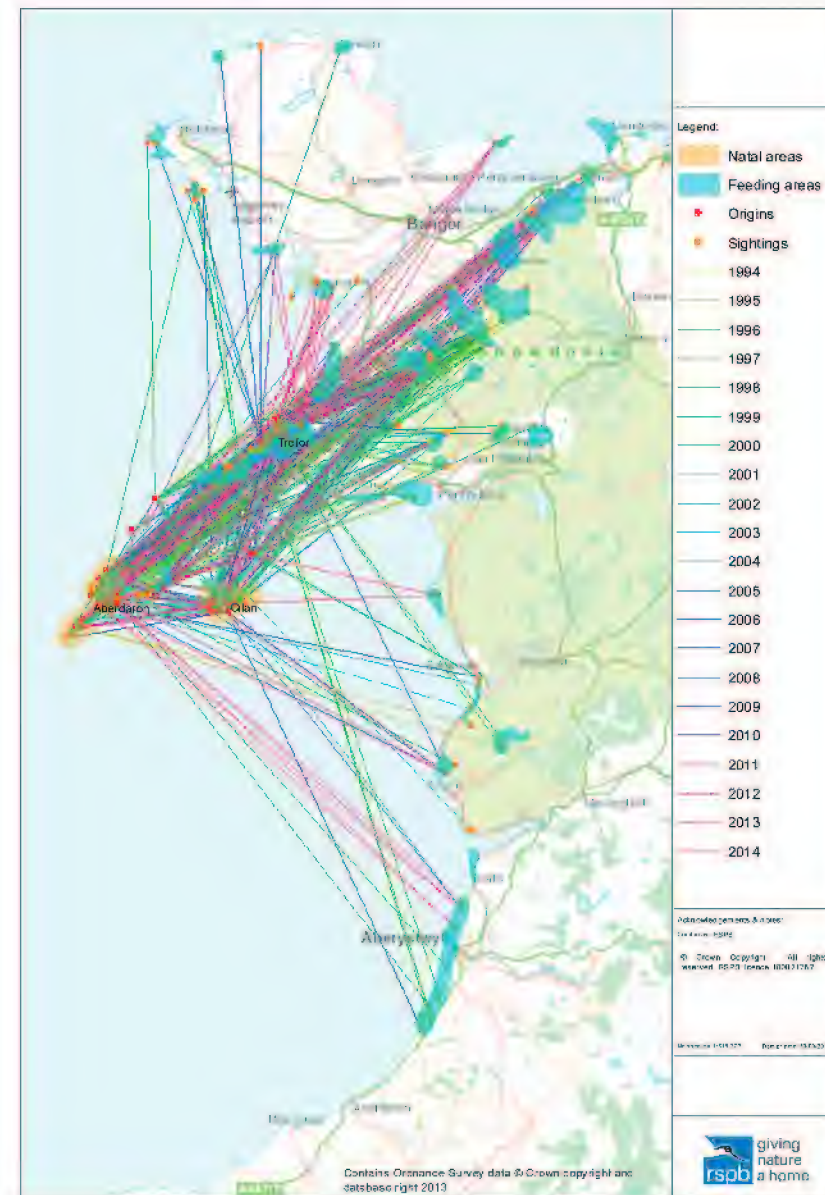


Figure 7. Map linking feeding areas with individual origins of Llŷn-bred Choughs, by year.

Distances and destinations of dispersing adults, from natal sites to nesting sites

Up to and including the 2013 breeding season, 411 breeding adult colour-ringed Choughs of known origin, from the wider project area of mid and North Wales, were identified at their subsequent nest-sites (200 males and 211 females).

This total includes 115 Llŷn-bred birds subsequently identified as breeding adults (54 males and 61 females) out of the total of 1,281 nestling Choughs ringed on Llŷn between 1991 and 2013. Of these, 94 were identified nesting at Llŷn nest-sites while 21 had moved away from the Llŷn to nest. This figure is outweighed by the 30 Choughs born outside of the Llŷn, which subsequently immigrated into the Llŷn as nesting adults, making the Llŷn a net importer of Choughs (Fig. 8).

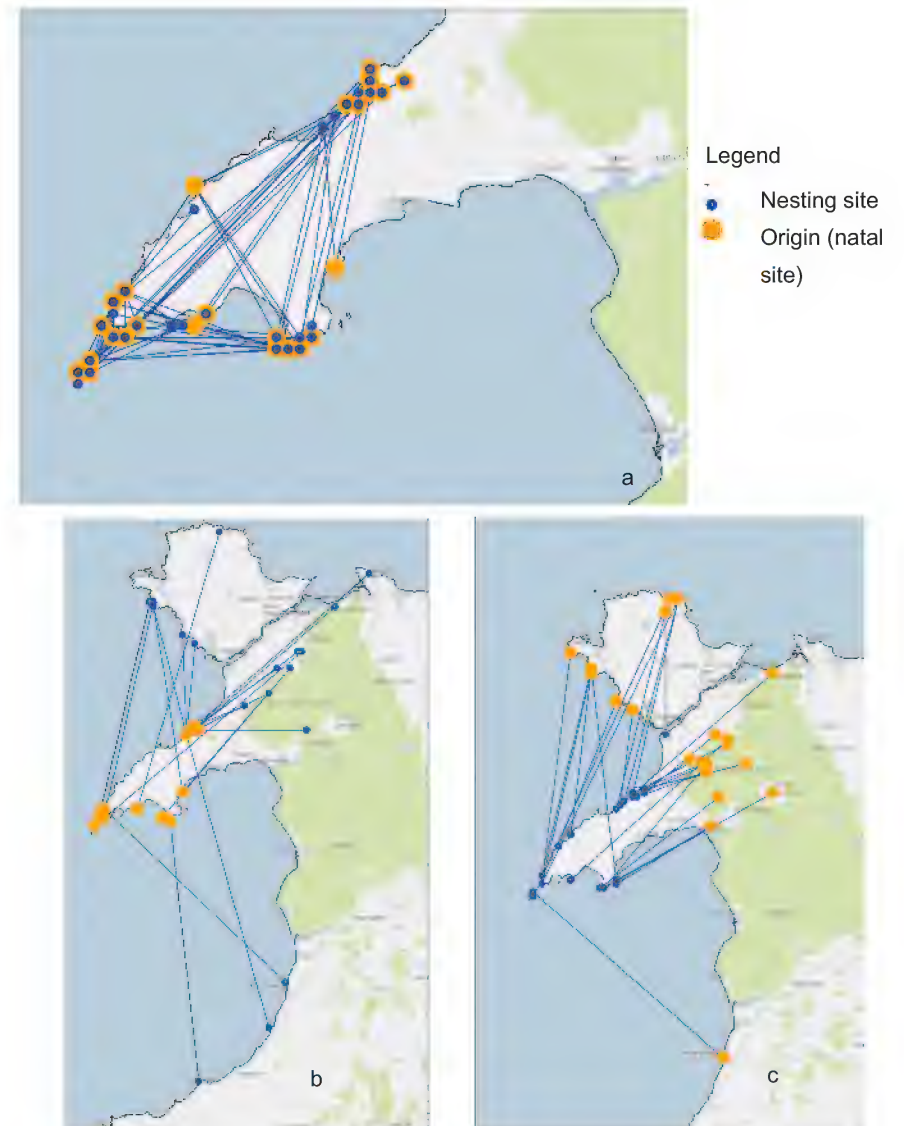
Breaking these movements down by sex is interesting (Table 5). Of the 54 male Choughs hatched on the Llŷn, 53 subsequently nested there and only a single individual emigrated, whereas of the 61 Llŷn-hatched female Choughs subsequently identified at nest-sites, 41 were nesting on Llŷn but 20 had emigrated.

Figure 9 shows the dispersal distances of the 115 Llŷn-bred birds subsequently recorded nesting, while Figure 10 shows how the dispersal patterns of males and females differ. Male dispersal distance from natal site shows a steep decline from a peak at 0-5 km whereas for females, dispersal peaks at 15-20 km and declines more gradually over a longer range of up to 70 km. The mean dispersal distance for Llŷn-bred females from natal site to nest-site was 23.2 km (n=61), more than twice that for Llŷn-bred males - 10.1 km (n=54).

This sexual difference in natal dispersal helps to prevent frequent inbreeding, although in such a scarce and restricted population, sibling pairings and parent/offspring pairings are perhaps inevitable and both have been recorded at low frequency in the current study.



Chough. Photo: Tony Cross



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Figure 8. Maps showing:

- a) local dispersal of Llŷn-bred Choughs to Llŷn nest-sites (only those over 15km shown).
- b) dispersal of Llŷn-bred Choughs to off-Llŷn nest-sites.
- c) immigration of non-Llŷn-bred Choughs to Llŷn nest-sites.

ALL NESTING ADULTS			
Nesting adults (411)	Born on Llŷn	Born off Llŷn	Total
Nesting on Llŷn	94	30	124
Nesting off Llŷn	21	266	287
Total	115	296	411

% ALL NESTING ADULTS		
% Nesting adults	Born on Llŷn	Born off Llŷn
Nesting on Llŷn	82%	10%
Nesting off Llŷn	18%	90%

NESTING MALES			
Nesting Males (200)	Born on Llŷn	Born off Llŷn	Total
Nesting on Llŷn	53	8	61
Nesting off Llŷn	1	138	139
Total	54	146	200

% NESTING MALES		
% Nesting Males	Born on Llŷn	Born off Llŷn
Nesting on Llŷn	98%	5%
Nesting off Llŷn	2%	95%

NESTING FEMALES			
Nesting Females (211)	Born on Llŷn	Born off Llŷn	Total
Nesting on Llŷn	41	22	63
Nesting off Llŷn	20	128	148
Total	61	150	211

% NESTING FEMALES		
% Nesting Females	Born on Llŷn	Born off Llŷn
Nesting on Llŷn	67%	15%
Nesting off Llŷn	33%	85%

Table 5. Numbers and percentages of nesting adults dispersing to or from Llŷn.

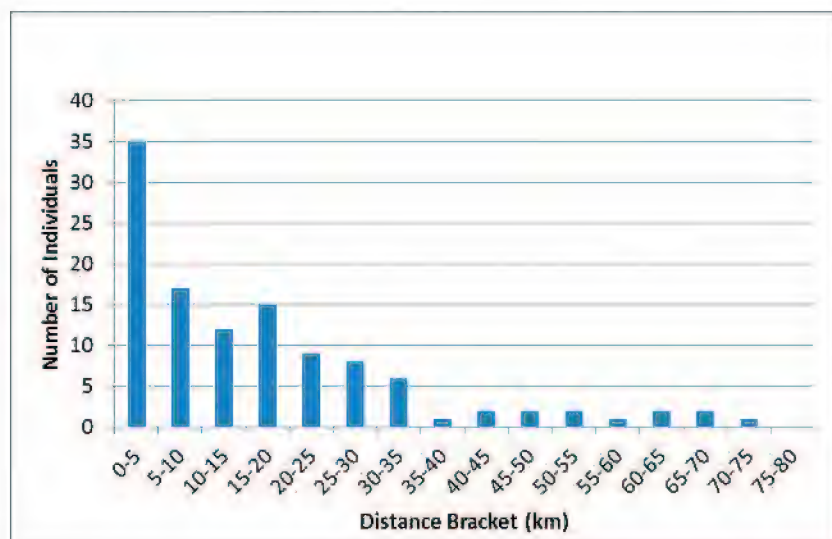


Figure 9. Dispersal distance from natal site of all Llŷn-bred nesting adults (n=115).

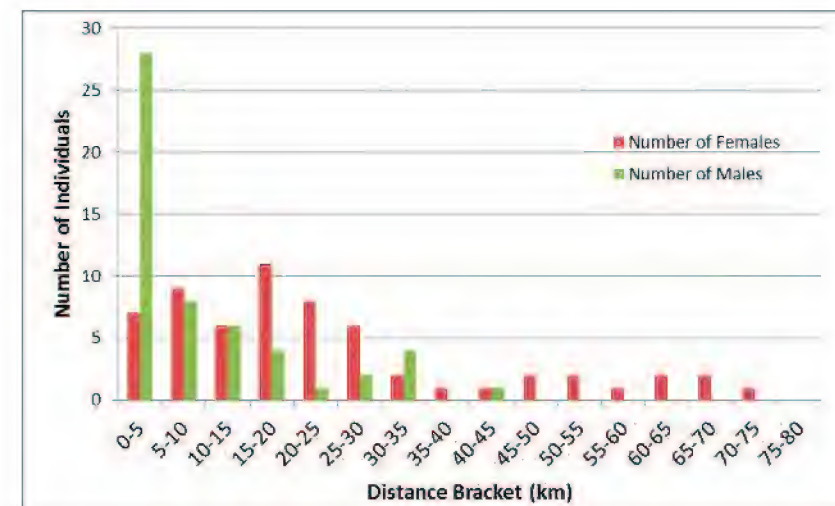


Figure 10. Dispersal distance from natal site to nesting site of all Llŷn-bred nesting adults (males: n=54, females: n=61).

Discussion

Prior to the commencement of the project, the generally held perception was that Choughs were relatively sedentary and that the coastal Choughs on the Llŷn probably stayed on the Llŷn. The results presented in this paper clearly show that this is not the case and that the Llŷn Choughs are dependent on a range of habitats in areas distributed throughout Anglesey, Snowdonia and Meirionnydd. These areas provide key foraging resources for post-fledging Chough and older non-breeding birds, and their importance to the conservation of Chough breeding on the Llŷn should not be underestimated. Although we cannot state with certainty what impact the loss of any one, or several of these “support” areas could have on the Llŷn Chough population, there are already suggestions that changes in grazing management of these areas has coincided with disappearance of non-breeding flocks and a much more mobile foraging strategy of autumn/winter flocks compared to the recent past. There have also been significant declines in the breeding population around the mountain autumn foraging areas which, again, indicates that these are no longer in such favourable condition for Chough as was previously the case. As the Chough is a long-lived species, demonstrated by our findings, and as experienced adults are usually able to rear young successfully, any underlying survival and recruitment problems may not become apparent for several years. Because of this, we should not be complacent about responding to any early evidence that the Llŷn population is experiencing a decline (of between 11.7 and 20%) from the peak numbers of the early 2000s.

The need to consider Chough conservation on the Llŷn at a much wider, landscape scale is not just limited to consideration of the availability and use of foraging resources. The

data we have presented on pre-breeding dispersal to and from the Llŷn and that on differences in distances moved between the sexes, clearly show that the Llŷn Choughs are part of a much wider meta-population and that the conservation of other breeding populations will also be key to supporting the Llŷn population.

Our study also highlights the need to review the SPA network in Wales. While current numbers of Chough breeding in the two Llŷn Chough SPAs may be deemed acceptable, recruitment of future breeding birds to replace the existing pairs, or to increase the current population, is clearly dependant on the existence and health of the non-breeding flocks and therefore on securing positive conservation measures for Chough, on land both on and outside of the Llŷn. Without maintaining other North Wales SPAs, designating additional SPAs or SSSIs, or providing other effective mechanisms for safeguarding land used by Chough, the current Chough populations within the Aberdaron and Cilan SPAs are unlikely to be maintained.

A partnership-based, landscape-scale approach to Chough conservation appears necessary, if the condition of the Chough population on the Llŷn is to remain favourable. It is therefore encouraging that the Llŷn Coastal Partnership is actively preparing a project that will aim to address this, using this paper to help guide what the issues are around Chough, and ensuring that the measures required for Chough conservation are fully integrated with those of other wildlife, and with the needs of the people and communities that manage the land that Chough use. We wish the partnership every success in this work and in having a positive impact on Chough in North Wales.

Acknowledgments

We would like to thank all the landowners within our project area for allowing access for ringing and monitoring. We are also indebted to over five hundred individuals, unfortunately too many to name individually, who have given up their time to assist us with our project in various ways over the years, including colour-ring reading and other observations, nest monitoring, assisting with ringing operations, climbing, ladder-carrying and minding of belay-stakes.

Some fieldwork for our project has been sponsored by National Trust, Ecology Matters and RSPB.

Steve Stansfield and the staff at the Bardsey Bird and Field Observatory have provided details of the birds they have ringed on Bardsey and many observations.

We are very grateful to the National Trust and Natural Resources Wales for funding the data analysis necessary for this paper and for continued support from RSPB Cymru.

Special thanks to Sharolyn Parnham at RSPB for turning our data into the maps presented in the paper, to Andy Young for writing the macros used in our spreadsheets and to Celyn Thorpe for her help with formatting the graphics. Lastly, thank you to both

our families for tolerating our almost total absence from family life each spring and for helpful input into this paper.

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Sand Martin Banks at Parc Slip

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In early Spring 2015, The Wildlife Trust of South and West Wales (WTSWW) was able to create artificial Sand Martin *Riparia riparia* banks at its Parc Slip Nature Reserve in South Wales, thanks to support from the Welsh Ornithological Society (WOS). In total, 52 potential nesting burrows and chambers have been provided for the birds through the creation of two artificial banks. One of the banks, situated in the new Scrapes Field, was visited by Sand Martins on two separate occasions, but no evidence of nesting was observed. The creation of the other bank had to be postponed halfway through its creation due to a pair of Lapwing *Vanellus vanellus* which decided to nest nearby. Now that the plover's breeding season is over, work has once again commenced.



Photo: Rob Parry

A Swift Recovery Project

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This is a North Wales Wildlife Trust project, supported by a small grant from the Welsh Ornithological Society, as well as support from Gwynedd Council. The aim is to try and orthaddress a decline in Swift *Apus apus* numbers in N Wales by a) putting up nest boxes in appropriate locations, b) educating people in the area about Swifts and their breeding requirements, and c) encouraging collection of breeding Swift records to boost existing knowledge.

Some 22 boxes were installed at nine different locations in Gwynedd and Anglesey in time for the 2015 breeding season – all in areas where Swifts have nested in the past. These include a school, a church, a chapel, a leisure centre, housing authority flats, and university buildings as well as private houses.



Photo: Rob Booth

Publicity was put out in local and national papers as well as social media, promoting the project and calling for any records of Swift breeding. A special Swift recording scheme has been set up with local record centre, Cofnod, for people to enter their data: <http://www.cofnod.org.uk/LinkInfo?ID=10>. Further work with local schools is planned to help spread the message with children and young people.

Liaison with BTO Cymru, RSPB, Gwynedd Council Biodiversity Department, and Swift Conservation has helped to pool information and hopefully take swift work forward in North Wales. Connections made with major property owners such as Bangor University, the Church in Wales, Holyhead Port Authority and N Wales Housing Association promise further collaborations to help Swifts in the future.



Photo: Rob Booth

Obituary

Derek Raymond Moore OBE

1st January 1943 to 23rd October 2014

Anne Brenchley

Tŷ'r Fawnog, 43 Blackbrook, Sychdyn, Mold, Flintshire, CH7 6LT

Derek was a passionate birdwatcher all his life and later became a real innovator in the modern conservation movement and for most people who encountered Derek, it will be for these reasons, as well as his broadcasting prowess, that he will be remembered. However, Derek's journey to that position was far from traditional. Whilst many of his peers were doing the normal teenage things, Derek was out on the Suffolk coast with his mentors, learning all he could about the local birdlife. His tenacity gained him the trust of Bert Axell, which was no mean feat, and Derek was able to help out at RSPB Minsmere in an era when Bert allowed few people to have free rein on the reserve. Despite his obsession with birds, Derek also had other diversions and found time to play cricket, play in a band and be a lifelong supporter of Norwich City Football Club (maybe a strange choice seeing that Ipswich Town was his local team!). Derek's work career took him into the realms of finance, meeting his wife Beryl during this time, and his financial knowledge was to be put to excellent use in his later career in conservation.

Derek didn't get into conservation through the usual route as he didn't have a degree or work his way up through the ranks of a conservation organisations but when the opportunity arose to make a difference to his beloved Suffolk he grabbed the chance very quickly. I first met Derek, the year that he took on the role of Director of the Suffolk Trust for Nature Conservation (Suffolk Wildlife Trust – SWT as it is now). Derek was a breath of fresh air. He was determined to create a professional go-ahead organisation that was both financially viable and also led the way with nature conservation management. Derek brought his extensive business approach to the management of SWT, which came as a bit of a shock to the Wildlife Trust movement but proved to be very effective. His lack of formal conservation training was no barrier to Derek's understanding of wildlife and probably helped in his somewhat unorthodox and innovative approach to conservation issues. Derek was practical and pragmatic. Ideas were tried out as carefully calculated risks and lessons would be learned from mistakes. Derek was one of those rare people who had big ideas and then put them into action. He didn't suffer fools gladly, he was very straightforward and said what he thought and for the most part this made him many friends and much respect.

Derek had a vision that not all the trustees and staff could understand at the time but he was proved right more often than not. Derek believed in working with critical partners such as the RSPB, English Nature (now Natural England) and local farmers. He oversaw the move to new offices, funded and built education centres, saw Redgrave and Lopham Fen and Bradfield Woods raised to the status of National Nature Reserves, instigated free entry to reserves (a very radical move at the time) and introduced Konik ponies from Poland to manage wetlands. Membership dramatically increased as did the profile and

reputation of the conservation movement in Suffolk. In 1999, Derek was awarded an OBE for services to nature conservation and this was an accolade for which he and his family were rightly very proud. Many years later Derek's approach to conservation management was to become the case study topic of an MSc thesis written by Lucy McRobert in 2012. Lucy herself is now an active champion for young wildlife enthusiasts, a cause that was close to Derek's heart. Derek left the SWT in the safe hands of Julian Roughton in 1999 and worked briefly at The Wildlife Trusts Head Office before being asked to use his extensive management skills to good use in Wales.

Derek was a real birdwatcher, not a twitcher although he wasn't above going to see rare birds on his local patch and one of my first memorable encounters with Derek was to see a Nutcracker at Westleton in 1985. In his later years, Derek took the opportunity to travel more widely to see exotic birdlife. Derek and Beryl had always been very hospitable and made many lifelong friends from all parts of the globe. Also Derek's son Jeremy lived abroad as part of his work and this created even more birding opportunities in the Netherlands, Oman, Brunei and more recently Canada. Derek would then add to these experiences by chatting up travel organisations at the Rutland Birdfair and organise trips by gathering together a group of like-minded friends and colleagues to help reduce the overall costs. I was fortunate enough to go to Costa Rica, northern India and the Pantanal in Brazil with Derek. These were no ordinary trips, they were filled with laughter, jokes and the inevitable flow of Derek's tall, or not so tall, tales. The wonderful mixture of humour and very sharp ears and eyes always made these foreign forays extremely memorable and Derek was the catalyst.

Wales was fortunate to have been Derek's home for the last years of his life. Derek was asked by The Wildlife Trusts to secure a future for the trust movement in south and west Wales. This didn't necessarily make him popular but the merger of two trusts to form the now Wildlife Trust of South and West Wales was vital. Once this project had succeeded, Derek was then asked to try and unite the Wildlife Trust movement in Wales as a whole but this admirable aim was only partially achieved before Derek formally retired. Now he was free to take on other roles. As the Welsh Ornithological Society was going through a phase of change, Derek saw the opportunity to make a difference. Derek was Chair of WOS from 2006 to 2014. In that time, WOS raised its profile through organising very successful annual conferences, introducing the Lifetime Achievement Awards, Student Awards (now known as the 'Derek Moore Student Awards'), Research grants and improving communication tools such as the website and e-newsletters. WOS has a great deal to thank Derek for and his untimely death has left a considerable hole to fill, however, he left the organisation with a good solid foundation for further improvement.

Derek did so much in his life and hopefully his enthusiasm and knowledge rubbed off on many of the younger conservationists that he met and mentored over the years. He was always keen that the younger generation should be equally inspired by nature and that today's youngsters should have as many if not more opportunities as he had when starting out his career. Many donations given in Derek's memory have gone to this cause.

Derek is survived by his wife Beryl, his daughter Bronwen, son Jeremy, Jeremy's wife Saskia and their three children Morris, Tara and Holly.

Book Reviews

A new self-published book, entitled *British birds - names~tales~myths* by Geoff Green explores the intriguing world of the names of 231 British birds. The book examines the wide range and meaning of local bird names, the derivation and meaning of the vernacular English name and also their scientific name. This gives a fascinating insight into our long and intimate relationship with birds. Many myths, tales and lore are recounted establishing the characteristics we attribute to birds often linked to their names. Collective nouns are given providing another useful insight into the nature of birds.

Alongside this the book adds many interesting facts and figures ranging across a bird's breeding behaviour, migratory feats, feeding habits, song, physiology and detail of their often extraordinary senses to our treatment of birds. Notes are given of the relative increase and decrease in some bird's numbers.

Enjoy this book as a serendipity of the fascinating meanings of the diverse names given to British birds, intriguing information on their lives and the many tales about them, true and otherwise.

The book can be found on the Amazon Bookstore - search for 'British bird names' and you can obtain the book as an e-book or paperback. Alternatively contact Geoff Green at gddgreen@talktalk.net or 'phone 01404 813127 and he'll send you a paperback copy (£9.50 incl.postage).

Received for review:

The Life of Buzzards by Peter Dare

Collins BTO Guide to British Birds

